The Shasta-Trinity Trail Plan
and Environmental Assessment

National Park Service
U.S. Department of the Interior

Whiskeytown National
Recreation Area

June 30, 2005

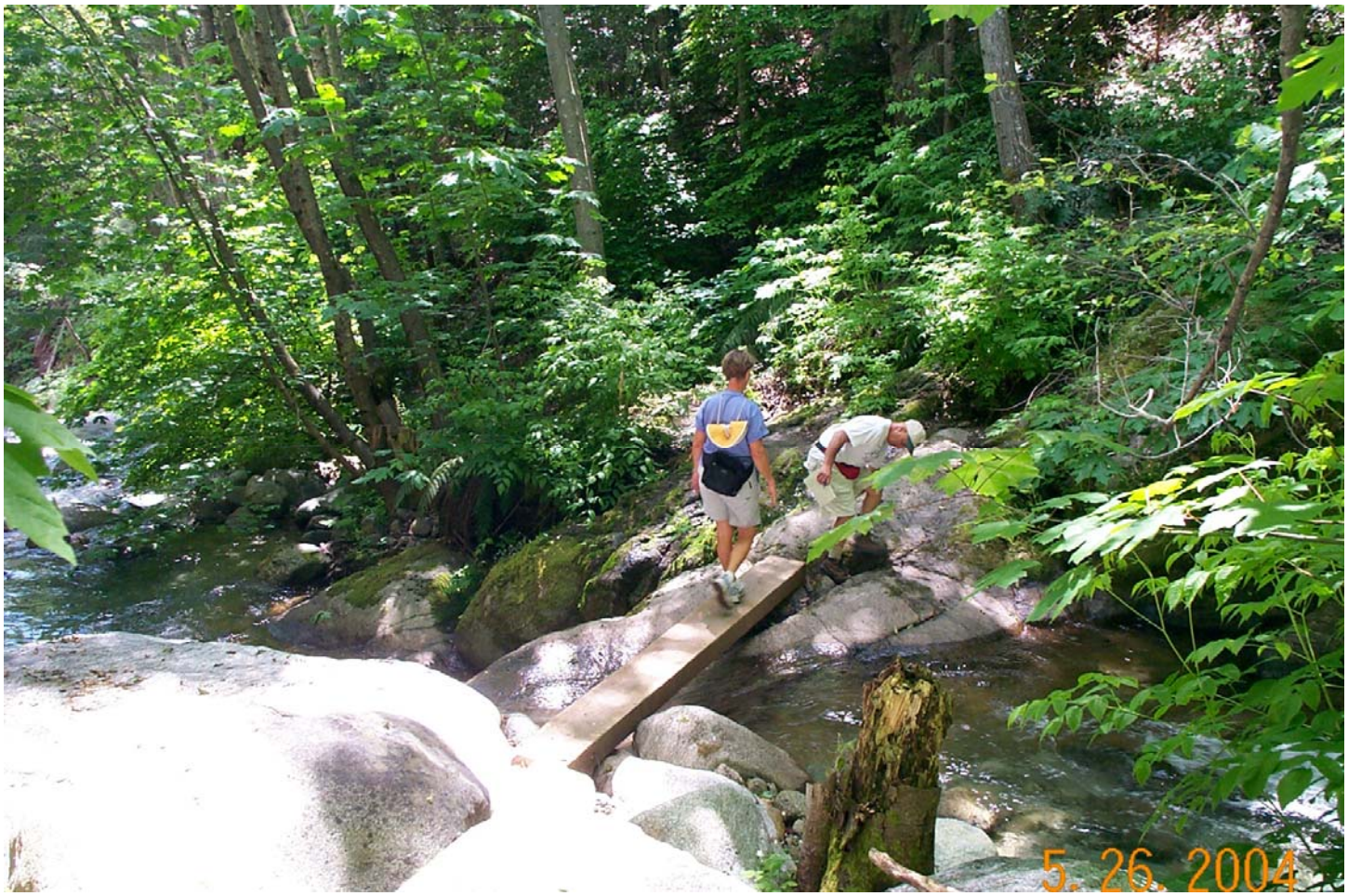


TABLE OF CONTENTS

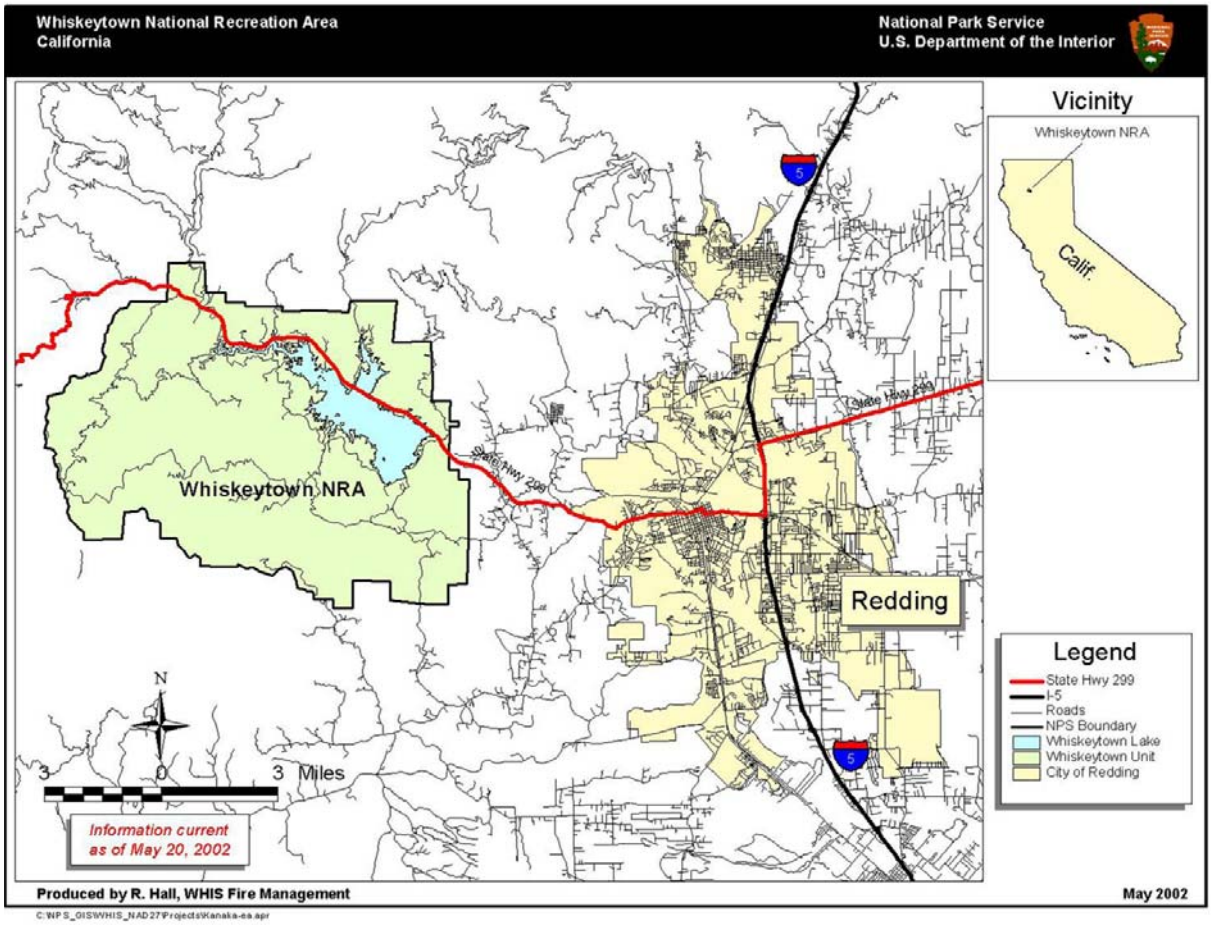
INTRODUCTION

Establishment of Whiskeytown National Recreation Area

Whiskeytown National Recreation Area is the National Park Service unit of the Whiskeytown-Shasta-Trinity National Recreation Area. It is located in Shasta County, California, about 8 miles (13 kilometers) west of downtown Redding (see Figure 1). The park contains about 42,500 acres (17,000 hectares) of land and water. Elevations range from 800 feet (250 meters) in lower Clear Creek below Whiskeytown Dam to over 6,200 feet (1,900 meters) atop Shasta Bally. Vegetation in the lower elevations consists of oak woodlands and chaparral; mixed conifer in mid-elevations and mixed conifer-old growth forest in higher elevations. Most of the mid-elevation mixed conifer forest is second growth resulting from logging between the 1940s to early 1970s. Whiskeytown Lake, created by the earth-filled Whiskeytown/Clair A. Hill Dam on Clear Creek, has a surface area of about 3,200 acres (1,300 hectares).

Whiskeytown National Recreation Area was established by the Act of November 8, 1965 (P.L.89-336), *"…to provide, for the public outdoor recreation use and enjoyment of the Whiskeytown reservoir and surrounding lands…by present and future generations and the conservation of scenic, scientific, historic and other values contributing to public enjoyment of such lands and waters."* Whiskeytown Lake provides high quality reservoir recreation opportunities because of its forested mountain setting, clear water, and its lake-like appearance. The reservoir is kept full throughout the summer months. The park has an average visitation of about 700,000 visitors per year. Visitation levels can soar in dry years when other nearby reservoirs are severely drawn down. The Bureau of Reclamation manages the power and water supply functions of Whiskeytown Dam and Reservoir. The National Park Service manages all other facilities within the recreation area including all lands, streams, and associated forest.

Figure 1. Location of Whiskeytown National Recreation Area



History of the Shasta-Trinity Trail

Interest in creating a regional trail linking the City of Redding with the Trinity Alps Wilderness first appeared in the mid-1990s when efforts to restore the watersheds of Upper and Lower Clear Creek were being planned. In 1999, a number of meetings were held by a variety of interested people and organizations to further refine the Shasta-Trinity Trail concept. In July of that year, a proposal and application for assistance in planning the route for this trail was submitted to the National Park Service's Rivers and Trails Program by the combined efforts of Whiskeytown National Recreation Area, the Bureau of Land Management, the U.S. Forest Service, the City of Redding, Congressman Wally Herger's office, the Horsetown Clear Creek Preserve, and the Trails and Bikeways Council of Greater Redding. In 2000, inventorying of resources along the trail's tentative route was begun and several segments of the trail were constructed by the Bureau of Land Management and the City of Redding. In December of 2000, the Shasta-Trinity Trail Concept Plan was completed. This Concept Plan (2000) identified a proposed route for the Shasta-Trinity Trail by *planning regions*; these included: 1) the lower Clear Creek Region, 2) the Redding Region, 3) the Whiskeytown Region, 4) the French Gulch/Interlakes Region, and 5) the Trinity Region. Information for these regions in the Concept Plan included:

a) existing trails
b) planned, but not yet completed trails
c) corridors for new trails, such as old roads, historic water ditches, fuelbreaks, etc.
d) existing and potential trailheads

e) land ownership
f) opportunities/constraints
g) follow up tasks and recommendations.

This information was used to help develop broad corridors in which the trail could eventually be built, with the idea that the more specific trail alignments would have to be identified in the future by the individual lead agencies (entities with the local, state, or federal jurisdiction over the lands through which the trail would pass). The lead agencies would work through a Steering Committee to promote cooperation and achieve consistency in trail design, operation, and management over the length of the trail. Appendix 9 shows the Shasta-Trinity Trail in its entirety, as foreseen in the draft Concept Plan.

Whiskeytown National Recreation Area's portion of the trails in the Concept Plan was divided into 4 individual trail segments:

1) Mule Mountain Ridge to Peltier Valley Road
2) Peltier Valley Road to Sheep Camp
3) Sheep Camp to Boulder Creek
4) Boulder Creek to Trinity Mountain Road

The BLM, NPS, City of Redding, and the California Conservation Corps met in Spring 2002 to coordinate a construction plan to link the area by trail, from Mary Lake (Westside Trail) to Whiskeytown. A field trip was held and a general location for the route was determined.

In the Fall of 2003, the BLM and the NPS hired the California Conservation Corps to construct the portion of the Shasta-Trinity Trail beginning at Swasey Drive Recreation Area on BLM land and connect to Whiskeytown's Salt Creek Trail for a total of 5.5 miles of trail (4.4 miles on BLM land and 1.1 miles on NPS land). On February 12, 2004, thirty volunteers assisted NPS and BLM in completing the final 200 yards of this new trail.

With the directives discussed in the Concept Plan and the completion of the BLM's Mule Mountain Pass portion of the trail into the park, Whiskeytown NRA has begun to further refine the Shasta-Trinity Trail alignment within its jurisdictional boundary. The National Park Service revised the Concept Plan's sections within Whiskeytown from four sections to three. This revision was made primarily due to the similarity of the affected environment and potential environmental impacts within these sections. The original maps and segment descriptions from the Concept Plan are included in the appendices (Appendices 1 through 8).

Why a Trails System is Needed

Upon Whiskeytown National Recreation Area's designation as a unit within the National Park system, plans to provide services to park visitors focused on facilities to support recreational uses of Whiskeytown Lake and the forested areas comprising the remainder of the Whiskeytown Unit. The trails that have evolved since the creation of the NRA have been developed in a piecemeal fashion, making use of existing logging roads, water ditches, utility corridors, and mineral exploration roads to the greatest extent possible in an effort to lessen the disruption to park ecology. This method of creating trails has produced a trails system that often does not take the visitor to the park's "special little places" that should be the destinations of a trails system.

Creation of an alignment for Whiskeytown National Recreation Area's portion of the Shasta-Trinity Trail offers an opportunity to examine the park's trails system and supporting facilities and to plan for the production of a coordinated system that will take park visitors to Whiskeytown National Recreation Area's many special places. .

The General Management Plan for the management, use, and protection of Whiskeytown National Recreation Area prepared in 1999 included the following statement about trails:

"Opportunities for expanding the park trail system and for linking park trails with regional trails need to be considered" (page 8).

Additionally, one of the GMP's goals addresses the limited use of Whiskeytown National Recreation Area's backcountry and sets forth nine "action programs" to encourage greater use of the park's land base, specifically, its backcountry. Such actions as improving selected backcountry roads for public use, creating and implementing a trail network plan, improving trail information for backcountry users, and improving backcountry camping opportunities were cited as the means to make the backcountry more accessible and utilized by park visitors.

A business plan prepared for Whiskeytown in 2003 identified 10 investment "priorities" that the park should make in the upcoming years. One of these suggests the construction of the Shasta-Trinity Trail which would:

"…provide users with a route from Redding to the Trinity Alps combining the park's desire to showcase its backcountry with the Redding community's strong support for quality local trails, national interest in regional trail systems, and the National Park Service's goal of linking communities to parks." This 10-mile trail from the park's east boundary to its northwest corner would highlight scenic views of Whiskeytown National Recreation Area and serve as the gateway for hikers, mountain bikers, and equestrians heading from the city west into the wilderness (NPS 2003).

CURRENT TRAILS AND FACILITIES

History and Description of Current Trails and Facilities

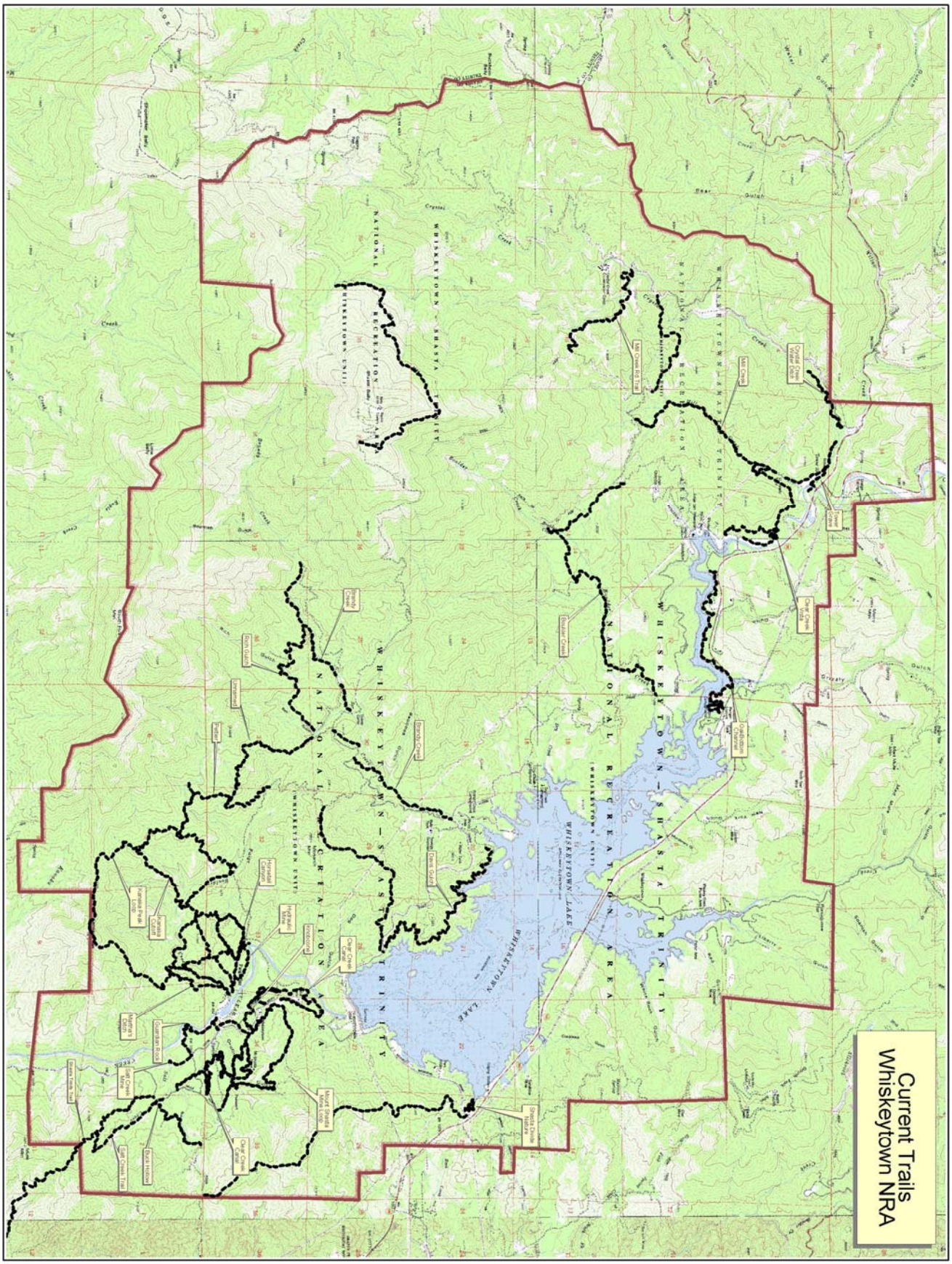
Whiskeytown National Recreation Area currently maintains approximately 70 miles of trails. The majority of these trails are abandoned roads formerly used for logging or mining. Several of the current trails follow the alignment of water ditches that were constructed to assist in gold mining efforts. Two trails, the Davis Gulch Trail and the Shasta Divide Nature Trail, were constructed by the Job Corps shortly after the Whiskeytown Unit was created.

The trails at Whiskeytown National Recreation Area are open to equestrian, biking, and hiking use with the exception of the Davis Gulch Trail and the Shasta Divide Nature Trail. These two trails are open only to hikers. Due to the purposes of the original construction of most of the trails within WNRA (logging, mining, water ditches), most of the trails do not incorporate specific destinations or scenic vistas. Additionally, many of the current trails have very steep sections that are prone to erosion and are difficult for visitors, particularly those biking or horseback riding. WNRA has rerouted some trails or sections of trails recently to reduce erosion and maintenance needs while improving the visitor experience. WNRA has also improved the facilities along the trail system recently by adding signage along trails and constructing vault toilets at the Mount Shasta Mine Loop Trail Parking Area and at Horse Camp, both popular parking areas for trail users. Additionally, potable water was recently installed at Horse Camp to accommodate visitors.

Table 1. Current Trails and Their Lengths

NAME	MILES
Boulder Creek Falls Trail	0.12
Boulder Creek Trail	3.57
Buck Hollow Trail	0.99
Camden Water Ditch Trail	0.74
Clear Creek Canal Trail	4.46
Clear Creek Vista Trail	2.43
Crystal Creek Water Ditch Trail	0.83
Davis Gulch Trail	3.15
Guardian Rock Trail	0.98
Horsetail Canyon Trail	1.21
Hydraulic Mine Trail	0.51
Kanaka Cutoff Trail	1.00
Kanaka Peak Loop Trail	6.17
Knobcone Trail	0.33
Ladybug Lane	0.27
Logging Camp Trail	0.92
Lower Brandy Creek Trail	1.62
Manzanita Cutoff	0.38
Martha's Ditch Trail	0.73
Mill Creek Rd. Trail	1.74
Mill Creek Trail	2.01
Monarch Mountain Trail	2.11
Mount Shasta Mine Loop Trail	3.15
Mule Mountain Pass Trail	2.96
Oak Bottom Water Ditch Trail	2.75
Peltier Trail	1.85
Prospect Trail	0.29
Rich Gulch Trail	1.78
Ridge Trail	0.84
Salt Creek Mine Trail	0.26
Salt Creek Trail	1.88
Shasta Divide Nature Trail	0.41
Shasta DivideTrail	3.46
Salt Gulch Trail	1.60
Tower Grave Trail	0.23
Upper Brandy Creek Trail	1.76

Maps of Current Trails and Facilities



HOW THIS PLAN WAS DEVELOPED

The Scoping Process

Scoping is an early and open process to determine the breadth of environmental issues and alternatives to be addressed in an environmental assessment. The staff of Whiskeytown National Recreation Area conducted several internal scoping sessions to both discuss possible alignments the Shasta-Trinity Trail could take through the park and then to discuss some of the potential impacts to park resources of these alignments in order to determine their feasibility. As a result of these sessions, the interdisciplinary team defined the purpose and need for the proposed action, identified potential alignments that would address the need, determined what the likely issues and impact topics would be, and identified the relationship, if any, of the proposed action to other planning efforts in the park.

Public Participation in the Plan Development

Whiskeytown National Recreation Area conducted external scoping with the public and interested affected groups and agencies first in 2002 and again in the spring of 2005. A total of three public meetings were held to discuss the Shasta-Trinity Trail. Press releases and notice of public scoping meetings were sent out (see Appendix 1 for copies of these notices) giving interested groups and individuals pertinent information about the meeting location and the meeting's purpose.

The first meeting, held on October 22, 2002, in the Bureau of Land Management's conference room in Redding, was more conceptual in content since no alignment for the trail had been proposed at that time. In 2005, two public scoping meeting were held; one on March 23rd and another on May 17th, at Shasta Elementary School. These meetings focused on trail alignments and facilities. About two dozen people attended each of these meetings and commented on and asked questions about the proposed project.

Issues Raised During Scoping Processes

From these meetings, Whiskeytown National Recreation Area staff collected comments from attendees about their ideas or concerns about the trail. These focused on:

1. Impacts to threatened or endangered species and historic ditches
2. Safety for users at stream crossings and from hunters
3. Trail standards and construction materials
4. Accessibility for all users and skill levels
5. Maintenance issues
6. User facilities like camp sites, trailheads, and restrooms
7. Signage, interpretation, and vistas
8. Need to work with other organizations, agencies, and property owners
9. Funding for trail construction and maintenance

ENVIRONMENTAL ASSESSMENT

Purpose and Need

Whiskeytown National Recreation Area proposes to construct a portion of the Shasta-Trinity Trail, a regional trail system extending from the City of Redding to the Trinity Alps, within its jurisdictional boundaries. The proposed trail will serve as a centerpiece for a system of trails that will take users to many of Whiskeytown National Recreation Area "special little places", allowing park visitors to experience a variety of park ecosystems and infrequently-visited areas.

National Park Service Management Policies (2001) state that each park should cooperate with other land managers, non-profit organizations, and user groups to facilitate local and regional trail access to parks—including when park lands abut other public lands. In addition, the park's General Management Plan (1999) states that it is the park's goal to provide an integrated network of designated backcountry trails. Lastly, Whiskeytown National Recreation Area participated in and supported the development of a Draft Concept Plan for the Shasta-Trinity Trail Connections Project, prepared in 2000 with a grant from the National Park Service's Rivers, Trails and Conservation Assistance Program. These management directives clearly indicate support for the creation of a trails system in the park.

This proposed trail system is needed to provide visitors with opportunities to safely experience the park's special places by foot, on horseback, or by bicycle. As both the City of Redding and Shasta County continue to grow, the park is expecting significant increases in use. In the interests of best serving the National Park Service's mission to both protect resources yet make these available for the enjoyment of the public into the future, Whiskeytown National Recreation Area needs to have a trails system in place to provide the appropriate means for visitors to enjoy these desirable land-based resources comparable with those provided by the park's water-based recreation facilities.

Description of Alternatives

The Shasta-Trinity Trail's potential alignment in Whiskeytown National Recreation Area is governed by a number of major goals which park staff deem critical to sustaining the health and well-being of park resources into the future. These are:

- To construct trails and rehabilitate existing roads and trails in a manner that promotes proper hydrologic functions;
- To provide an improved park visitor experience related to hiking, biking, and equestrian use;
- To provide appropriate levels of trail-related facility development along the Shasta-Trinity Trail Corridor;
- To allow visitors access to scenic areas of the park not currently or easily accessible;
- To avoid, to the greatest extent possible, highly erosive soils – primarily decomposed granitic soils associated with the Shasta Bally Batholith.
- To provide safe, non-vehicular access to trails at the southeast boundary of the park and in the Trinity Mountain Road area near the park's northwest boundary;

To achieve these goals, three alternatives for the Shasta-Trinity Trail system are being proposed. All three alternatives utilize, to the greatest extent possible, existing trails or old, non-vehicular logging or mining roads to promote a cross-park alignment for the main Shasta-Trinity Trail that will minimize extensive disturbance to undeveloped areas of the park. All non-motorized use will be allowed on all trails that are part of or connected to the Shasta-Trinity Trail System within Whiskeytown National Recreation Area. No new facilities are planned with the exception of a non-motorized staging area to be located off Trinity Mountain Road just north of the Tower House Historic District (along Clear Creek near the Merry Mountain Rd. crossing). Construction of the

staging area is mentioned in the park's General Management Plan and environmental compliance will be completed prior to construction and separately from this document.

The majority of the trails within Whiskeytown National Recreation Area traverse very steep and rugged areas and were not designed and built to Americans with Disabilities Act (ADA) standards. Due to the steep topography of the areas under consideration for new trail construction, it is not feasible to design the new trails under consideration within Whiskeytown National Recreation Area to meet ADA standards. The Whiskeytown Falls Trailhead parking area and approach to the kiosk will be constructed to ADA standards. In recent years, Whiskeytown National Recreation Area has installed two accessible fishing piers on Whiskeytown Lake at Oak Bottom and Whiskey Creek, and in 2004 installed a hardened path and platform leading from Brandy Creek Beach into Whiskeytown Lake to allow wheelchair confined visitors an opportunity to safely enjoy lake-based recreational activities.

Under all proposed alternatives, the current Shasta-Trinity Trail, within Whiskeytown NRA, will terminate at the proposed staging area just north of the Tower House Historic District. The purpose for this is that there are two potential alignments outside of the NRA which are still under consideration. One alignment leads north from the staging area outside of the park and parallels Clear Creek towards the town of French Gulch. The other potential alignment leads west from the staging area outside of the park and parallels Highway 299W until it intercepts the Lewiston Turnpike Road. At this time, there is no definitive schedule for construction of either of these sections outside of the park boundary. Environmental Compliance for the connecting trail section within the park will be completed when a final decision has made on the non-park portion leading towards either French Gulch or Lewiston.

The three alternatives proposed include:

Alternative A - No Action: This alternative proposes an alignment for the trail that utilizes only existing trails or roads currently available in the park (see Figure 2). No new trails or facilities would be constructed. No construction of new trails or associated facilities will occur. Only those trail improvements necessary for safety and trail identification would be made. Restroom facilities would be available at the Mount Shasta Mine Loop Trail parking area, at Peltier Bridge Campground, at the Brandy Creek primitive campsites, at Brandy Creek Picnic Area, at Carr Powerhouse, and at the Camden House Parking Area.

Section 1:
Under this alternative, the Shasta-Trinity Trail would enter the park from the south along the Mule Mountain Pass Trail. The trail would then follow a portion of the Salt Creek Trail until it intersects Mule Town Road which it would follow for a short distance to the Buck Hollow Trail. Trail users would then follow Buck Hollow Trail to Mule Town Road. Mule Town Road would be followed for approximately ½ mile to Prospect Trail. Prospect Trail would be followed to the intersection with the Mount Shasta Mine Loop Trail which will lead users to the Mount Shasta Mine Loop Trailhead and Parking Area. Trail users would then utilize Peltier Valley Road for 4.5 miles to access the Lower Brandy Creek Trail.

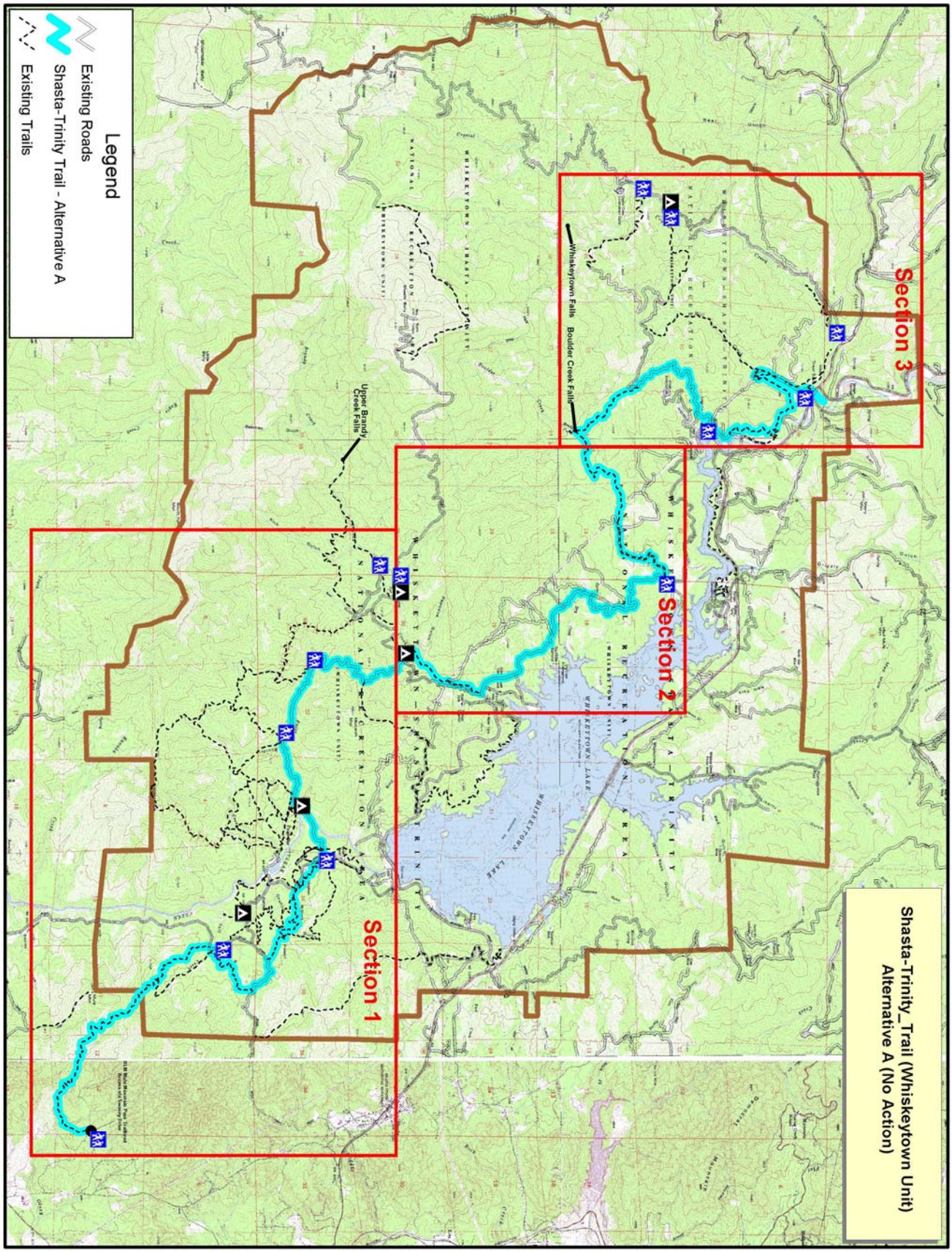
Section 2:
Lower Brandy Creek Trail would be followed to the trailhead near the Brandy Creek Picnic Area on South Shore Drive/Kennedy Memorial Drive. The trail would then follow South Shore Drive/Kennedy Memorial Drive for approximately 3.75 miles to the Boulder Creek Trailhead. The trail would follow the Boulder Creek Trail to the area near Boulder Creek Falls.

Section 3:
Boulder Creek Trail would then be followed past Boulder Creek Falls to its junction with Mill Creek Road. This road would be followed for 2.0 miles to the Clear Creek Vista Trailhead near Carr Powerhouse. Trail users would follow this trail past the El Dorado Mine, to the Camden House Historic District and under the bridge at Highway 299 to the proposed non-motorized staging area off of Trinity Mountain Road.

Facilities to support trail users would be the same as currently available and are found at the following locations in the park; however, these are not necessarily located directly along the trail:

1. Mount Shasta Mine Loop Trailhead Parking Area (restroom)
2. Horse Camp (camping, restroom, potable water)
3. Peltier Bridge Campground (camping, restroom)
4. Brandy Creek Primitive Campsite (camping, restroom)
5. Brandy Creek Picnic Area (restroom, potable water)
6. Sheep Camp (camping, restroom)
7. Carr Powerhouse (restroom, potable water)
8. Camden House Historic District (restroom, potable water)

Figure 2. The Shasta-Trinity Trail under Alternative A



Alternative B - Limited Trail Development: This alternative proposes utilizing existing trails where possible but would require a new section of trail to be built in the middle section (Papoose Gulch area) of the trail's proposed alignment (see Figure 3). Additionally, several small sections of the trail would be realigned or newly built to properly link the trail segments together. Trails would be maintained to support a variety of potential users and would contain vistas of the surrounding mountains and Whiskeytown Lake at selected points along the trail. A maximum of 6 footbridges will be installed at large stream crossings. These bridges will be break-away planks anchored by cable to natural features like tree trunks or nearby boulders. Under this alternative, use of roads allowing travel by vehicle would be minimal (3 sections totaling approximately 2 miles). Additionally, these sections of dirt road experience very little vehicle traffic and use as a trail will not detract substantially from the overall visitor experience.

Section 1:
Alternative B's alignment would see the Shasta-Trinity Trail enter the park along the Mule Mountain Pass Trail, then continue along a portion of the Salt Creek Trail until it intersects Mule Town Road as in Alternative A. However, a new section of trail (600 feet) would be constructed to keep trail users off Mule Town Road which receives some vehicular traffic and provide a connection to the Buck Hollow Trail. This trail will be followed unit it intersects the Mule Town Road (to Igo) which will then be used to reach the Prospect Trail. The Prospect Trail will be followed to the intersection of the Mount Shasta Mine Loop Trail which is followed to the intersection of the Knobcone Trail. Knobcone Trail will be followed to the bridge over Clear Creek near NEED Camp. A new section of trail (approximately 3000 feet) would be constructed to direct trail users away from NEED Camp and to connect to the area served by Martha's Ditch Trail. This trail would be followed until it intersects with the north portion of the Kanaka Peak Trail, which would be followed to reach Peltier Trail. Peltier Trail would take the user to Rich Gulch Trail that leads to a Shasta Bally Road south of the Sheep Camp turnoff. This roadway will be followed to access Upper Brandy Creek Trail leading to Sheep Camp.

Section 2:
From Sheep Camp, a new trail will be constructed in an area of the park where few pre-existing roads and no trails pass. This proposed new trail segment would first follow a ridge paralleling Papoose Gulch to a ridge top with an elevation slightly in excess of 3100 feet. The trail would proceed in a northwesterly direction along the ridge top and begin descending into the Boulder Creek drainage to meet the Boulder Creek Trail approximately one mile from the Boulder Creek Trailhead. The length of new trail that will need to be constructed is approximately 4 miles. The trail will then follow the Boulder Creek Trail to the area near Boulder Creek Falls.

Section 3:
Boulder Creek Trail will be followed past Boulder Creek Falls to its junction with Mill Creek Road. The trail then follows Mill Creek Road for approximately 1.5 miles before intersecting the Crystal Creek to Mill Creek Trail. This trail will be followed to the ridgetop between Crystal and Mill Creeks where a new trail will be constructed along the present fuelbreak that follows the ridge. This newly-constructed Mill Creek Trail would be located along the ridge paralleling the present stream-bottom trail. Approximately 2 miles of new trail will need to be constructed. This new alignment will provide better access for all trail users unlike the existing trail which requires 17 stream crossings, making it difficult for many users. The new Mill Creek Trail will utilize a short section of a Western Area Power Administration (WAPA) powerline access road to the section of the current Mill Creek Trail near the El Dorado Mine. The trail will then follow the existing trail past the Camden House and under the bridge at Highway 299 to the trailhead near Trinity Mountain Road.

Several segments of existing trails would be rerouted under this alternative. These trail segments are currently overly steep and promote erosion and require more maintenance than properly designed and constructed trails. Trails that have sections that would be rerouted or will have switchbacks added include Kanaka Peak Trail, Salt Gulch Trail, and Hydraulic Mine Trail (See Figure 3). In areas where trails are rerouted, the existing trail will be rehabilitated to natural conditions to prevent ongoing erosion and colonization by invasive exotic plant species and to prevent visitors from continuing to use old routes. Restoration measures will include recontouring

and/or application of weed-free straw mulch or native mulch and seeding or planting of native species.

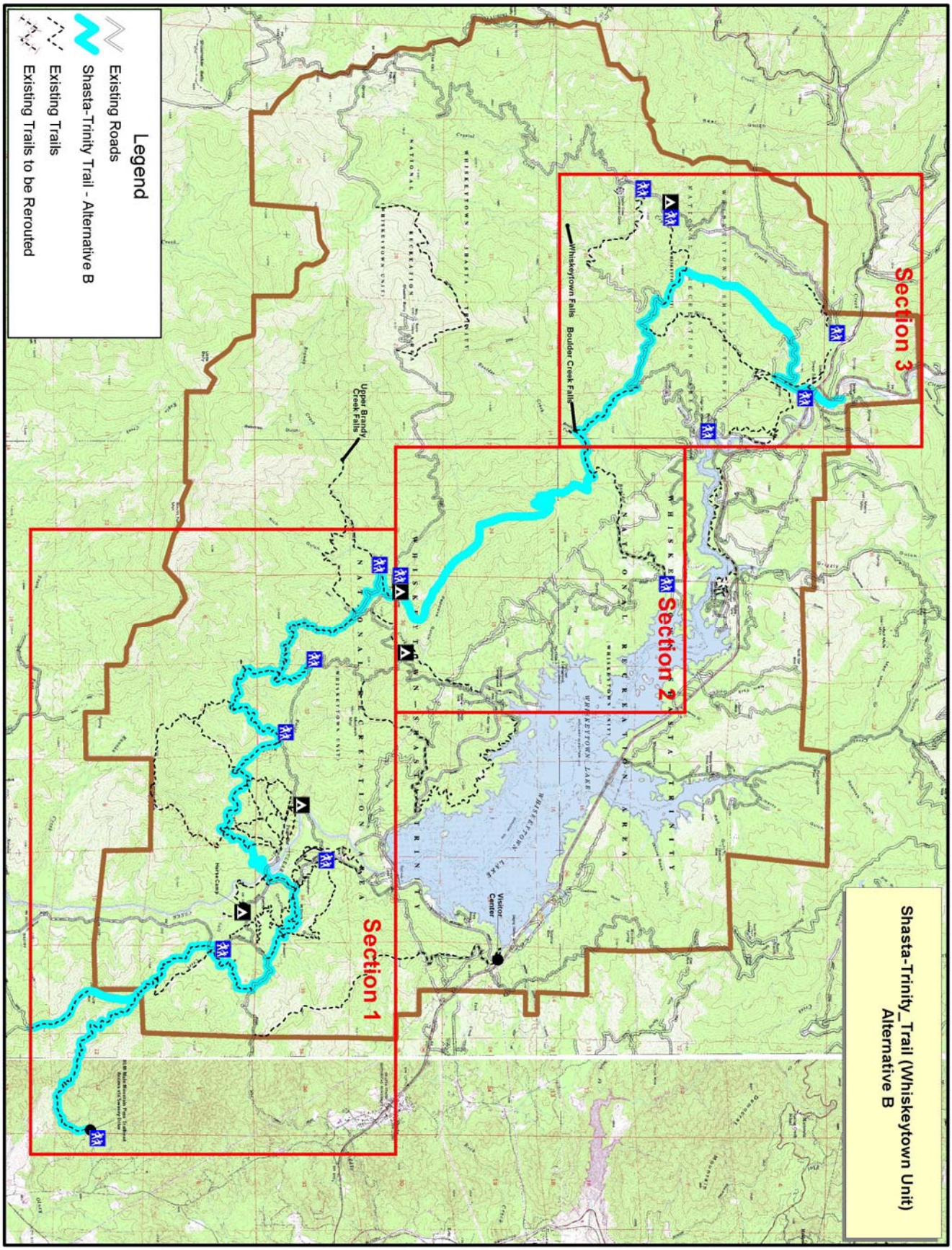
Trail segments that will be constructed under this alternative will be a maximum of 4 foot in width and vegetation will be cleared to 12 feet above the trail to accommodate equestrian users. The trail will also be outsloped to a maximum of 10 percent to promote water runoff and prevent erosion. New trails and rerouted sections of existing trails that are currently overly steep will have a maximum of 20% grade. New trails and rerouted sections of existing trails that are currently overly steep will have an average grade of 10% with localized areas not exceeding 20%.

Existing facilities to support trail users are found at the following locations in the park; however, these are not necessarily located directly along the trail:

1. Mount Shasta Mine Loop Trailhead Parking Area (restroom)
2. Horse Camp (camping, restroom, potable water)
3. Peltier Bridge Campground (camping, restroom)
4. Brandy Creek Primitive Campsite (camping, restroom)
5. Sheep Camp (camping, restroom)
6. Crystal Creek Campground (camping, restroom)
7. Camden House Historic District (restroom)

Existing facilities that would be available to trail users differs from Alternative A in that the Carr Powerhouse area (restrooms, potable water) would be bypassed and Crystal Creek Campground would be easily accessible to trail users.

Figure 3. The Shasta-Trinity Trail under Alternative B.



Alternative C – Expanded Trails System Development – The Proposed Action: This alternative contains all those actions proposed in Alternative B and adds additional recreational spur trails (see Figure 4). The Expanded Trails System alternative is a long-range, 10-year development plan that sees the Shasta-Trinity Trail as the centerpiece of Whiskeytown National Recreation Area's land-based recreational assets. The spur trails would provide users additional recreational experiences in areas of within the park that are currently under-utilized.

Under this alternative, all trails segments as described in Alternative B would be developed and upgraded and additional spur trails would be constructed to allow additional recreational opportunities for visitors. The Crystal Creek Water Ditch Trail would be connected to the Camden Water Ditch Trail to give visitors an additional area through the Tower House Historic District to explore. This trail will be approximately ¾ of a mile in length. From Crystal Creek Campground a trail would be constructed to take trail users to Whiskeytown Falls, a beautiful cascade/waterfall combination that is presently inaccessible to park visitors. The majority of this trail will follow the alignment of an abandoned logging road (approximately 1.6 miles) with approximately ¼ mile of new trail that will connect the logging road to the base of the falls. A metal handrail will also be installed and anchored into bedrock to allow visitors to safely access the vista point for viewing the falls. A kiosk will be constructed at the trailhead and will contain a map of the falls trail, information about the Leave No Trace program, and general information about the park and trail system. The trailhead parking area and approach to the kiosk will meet ADA standards for accessibility. A third spur trail would be constructed to follow an unnamed tributary between Liberty Gulch and Red gulch east of the Whiskey Creek arm of the lake. This trail is located outside of the Section 3 area (See Figure 4) but will be included in the Section 3 analysis of the Affected Environment and Environmental Consequences. The length of this trail is approximately ½ mile. This area is very picturesque and contains numerous remnants of turn-of-the-century mining activities that could be utilized for interpretive tours.

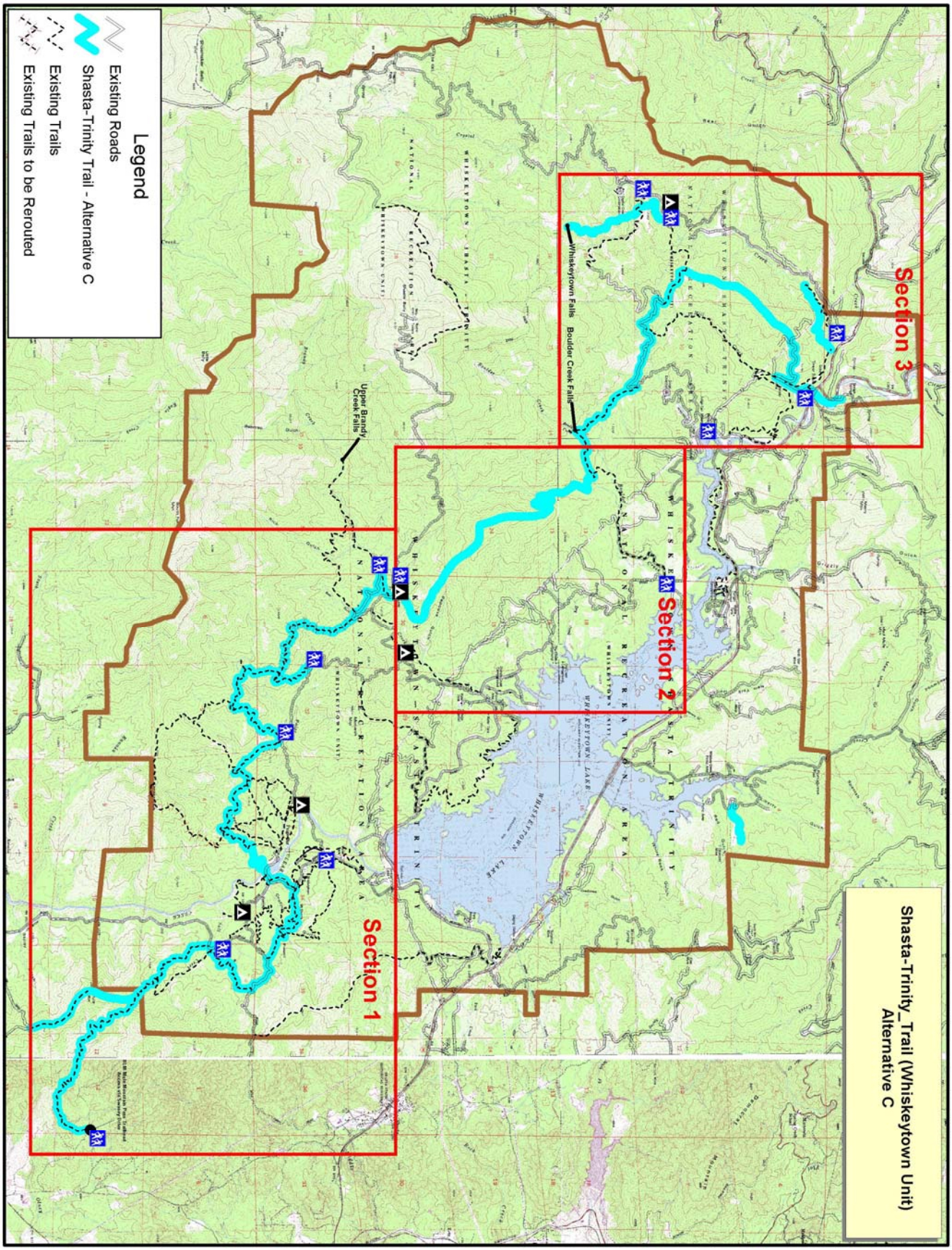
Several segments of existing trails would be rerouted under this alternative. These trail segments are currently overly steep and promote erosion and require more maintenance than properly designed and constructed trails. Trails that have sections that would be rerouted or will have switchbacks added include Kanaka Peak Trail, Salt Gulch Trail, and Hydraulic Mine Trail (See figure 4). Several segments of existing trails would be rerouted under this alternative. These trail segments are currently overly steep and promote erosion and require more maintenance than properly designed and constructed trails. Trails that have sections that would be rerouted or will have switchbacks added include Kanaka Peak Trail, Salt Gulch Trail, and Hydraulic Mine Trail (See Figure 4). In areas where trails are rerouted, the existing trail will be rehabilitated to natural conditions to prevent ongoing erosion and colonization by invasive exotic plant species and to prevent visitors from continuing to use old routes. Restoration measures will include recontouring and application of weed-free straw mulch and native seeding and plantings or native mulch for erosion control. A maximum of 8 footbridges will be installed at large stream crossings. These bridges will be break-away planks anchored by cable to natural features like tree trunks or nearby boulders

Trail segments that will be constructed under this alternative will be a maximum of 4 foot in width and vegetation will be cleared to 12 feet above the trail to accommodate equestrian users. The trail will also be outsloped at a maximum of 10 percent to promote water runoff and prevent erosion. New trails and rerouted sections of existing trails that are currently overly steep will have an average grade of 10% with localized areas not exceeding 20%.

Existing facilities to support trail users under this alternative are found at the following locations in the park; however, these are not necessarily located directly along the trail:

1. Mount Shasta Mine Loop Trailhead Parking Area (restroom)
2. Horse Camp (camping, restroom, potable water)
3. Peltier Bridge Campground (camping, restroom)
4. Brandy Creek Primitive Campsite (camping, restroom)
5. Sheep Camp (camping, restroom)
6. Crystal Creek Campground (camping, restroom)
7. Camden House Historic District (restroom)

Figure 4. The Shasta-Trinity Trail System under Alternative C – Proposed Action



Alternatives Eliminated from Further Study
One alternative that was eliminated from further study included aligning the majority of the trail on the north side of Whiskeytown Lake to take advantage of the facilities located at the Whiskeytown Visitor Center, at Oak Bottom Campground, and at Carr Powerhouse. This alternative was considered but dismissed due to several factors. This alternative would have provided a less appealing experience to most visitors due to it being located along the hot, dry, south facing slopes which are primarily covered with chaparral and provide little shade during the summer months. This alignment would have also been within sight and hearing distance of State Route 299 West and the PG&E distribution powerlines over much of its alignment through the park, further making this alignment less aesthetically appealing. Additionally, most of the park's current trail system is located on the south side of the lake and this alternative would have required more new trail construction than the other alternatives and would have had higher associated costs and adverse environmental impacts. Due to these reasons this alternative was eliminated from further study.

The Environmentally-Preferred Alternative

The Environmentally-Preferred Alternative: As described in the National Environmental Policy Act of 1969, the Environmentally-Preferred Alternative is the alternative that would:

1. Fulfill the responsibilities of each generation as trustee of the environment for succeeding generations;
2. Ensure for all Americans, safe, healthful, productive and aesthetically and culturally pleasing surroundings;
3. Attain the widest range of beneficial uses of the environment without degradation, risk of health or safety, or other undesirable and unintended consequences;
4. Preserve important historic, cultural and natural aspects of our natural heritage and maintain, wherever possible, an environment that supports diversity and variety of individual choice;
5. Achieve a balance between population and resource use that will permit high standards of living and a wide sharing of life's amenities;
6. Enhance the quality of renewable resources and approach the maximum attainable recycling of depletable resources.

The National Park Service has chosen Alternative C as the Environmentally Preferred Alternative. Based upon the above six criteria, Alternative C achieves the greatest degree of environmentally preferred benefits. However, due to the nature of this project all Alternatives are not applicable to criteria 6. All three Alternatives provide for criteria 1 through 5, the difference between Alternatives is the degree to which it addresses the criteria.

- Criteria 1 is achieved in all three Alternatives in equal magnitude;
- Criteria 2 is achieved by all three Alternatives. However, Alternatives B and C provide for a greater magnitude with C providing the greatest magnitude. Alternative C allows the visitor the greatest number of safe, healthful, productive and aesthetically and culturally pleasing surroundings by virtue of providing the greatest number of trails to areas that provides for this experience;
- Criteria 3 is achieved by all three Alternatives. However, Alternatives B and C provide for a greater magnitude with C providing the greatest magnitude. Alternative C allows for the greatest degree of beneficial uses; however, the inevitable spread of exotic plant species is undesirable and will be more widespread under Alternatives B and C.
- Criteria 4 is achieved by all three Alternatives. However, Alternative C provides the greatest diversity and variety of individual choice of trail selection;
- Criteria 5 is achieved by all three Alternatives. However, Alternative C allows higher standards of living by providing access to the greatest amount natural beauty and cultural resources.

The Affected Environment

This section contains background information and descriptions of the natural and cultural resources found in the park that could potentially be affected by the proposed action or the other alternatives discussed in this environmental assessment.

Whiskeytown National Recreation Area's Setting

Whiskeytown National Recreation Area is located in northern California in Shasta County, 85 miles inland from the Pacific Ocean, and eight miles west of the city of Redding, California, that has a population of approximately 85,000. The recreation area can be reached from both the east and west by California Highway 299. The park covers 42,503 acres, approximately 70 square miles, and includes the 3,220-acre Whiskeytown Lake. Whiskeytown Lake lies at the confluence of seven perennial streams that form one of the largest watersheds of the Sacramento River, and provides drinking water for several municipalities. Nearly six million people live within a day's drive of the park.

Most of the park's 46 mile boundary is bordered by private land, with some bordering lands administered by the Bureau of Land Management. There is one state-owned tract of 29 acres and six private tracts totaling 15 acres within the park. A recreational easement extending along lower Clear Creek from the park boundary to Placer Road is in mixed public/private ownership and, currently, the park does not exercise management over this easement. Elevations in the park are between 625 feet at the southern end of lower Clear Creek to 6,209 feet at the summit of Shasta Bally. The park consist of many varied habitats for a unique and diverse assemblage of plant and wildlife species.

The park is in an area of Mediterranean climate with hot, dry summers, and cool winters with moderate rainfall. At lower elevations, temperatures over 100° F often occur during the months of June through September; while subfreezing temperatures can occur from November through March. The frost-free growing season averages 250 days in the lower elevations (Biek 1988). The mean annual temperature is 58° F, as recorded at the weather station located at park headquarters. Reliable measurements of temperature at higher elevations are not available, but distinctly cooler temperatures are found at higher elevations. The average annual precipitation at park headquarters is 60 inches, nearly all of it in the form of rain. The south side of the lake receives higher rainfall totals than the north side. Seventy-five to ninety percent of the total annual rainfall occurs between November 1st and April 30th. Reliable figures on snowfall are not available; however, snow often remains at the higher elevations well into June.

Physical Resources

Air Quality

Whiskeytown National Recreation Area is classified as a Class II airshed under the Federal Clean Air Act (42 USC 7401 et seq. as amended). The Federal Clean Air Act stipulates that federal land managers have an affirmative responsibility to protect a park's air quality-related values, including visibility, plants, animals, soils, water quality, cultural and historic structures and objects, and visitor health from adverse air pollution impacts. The Clean Air Act, as amended in 1990, requires the Environmental Protection Agency (EPA) to identify National Ambient Air Quality Standards (NAAQS) to protect public health and welfare. Standards have been set for six pollutants: ozone (O3), carbon monoxide (CO), nitrogen dioxide (NO2), sulfur dioxide (SO2), particulate matter less than 10 microns (PM10), and lead (Pb). In 1997, EPA promulgated a revised NAAQS for ozone and a new NAAQS for particulate matter less than 2.5 microns (PM2.5). In the spring of 1999, an U.S. Court of Appeals panel remanded the standard to EPA for further consideration. However, in early 2001, the Supreme Court upheld EPA's authority to set these new more stringent standards.

The Shasta County Air Quality Control District regulates air quality issues within Whiskeytown National Recreation Area. Shasta County**,** as well as the entire Sacramento Valley**,** is classified as non-attainment with the state PM10 standard, according to the California Air resources Board **(**CARB) Almanac of Emissions and Air Quality (2001). Air quality in the Sacramento Valley Air Basin is affected by pollutants generated locally, transported from metropolitan Sacramento, and sometimes is a combination of the two.

Air quality in the park is affected by internal and external air pollution sources. Internal air pollution sources include campfires, wood stoves, barbecues, prescribed and wildland fires, and motor vehicles. External air pollution sources include prescribed and wildland fires, industrial pollution**,** and motor vehicle emissions.

Geologic Resources

Whiskeytown National Recreation Area is located in the Eastern Klamath Metamorphic Belt of the Klamath Geologic Province. The five major exposed bedrock units range in age from the very old lower Devonian Copley greenstone to the relatively younger lower Cretaceous Shasta Bally batholith. Also present within Whiskeytown National Recreation Area are several dike intrusions ranging in composition from aplite to dacite. All Paleozoic units are folded, jointed, and thrust faulted and/or normal faulted. Unconsolidated Quaternary units expressed as colluvial and alluvial deposits locally overlie all units.

The oldest exposed bedrock units are the volcanic lower Devonian Copley greenstone and the Balakala rhyolite, which cover about 30% of the geology within Whiskeytown National Recreation Area. The units are considered contemporaneous in age and emplacement with an often inter-fingering contact relation. Both of these units are highly fractured, faulted, and folded, increasing their susceptibility to erosion. Stratigraphically above and in unconformable contact with these is the Bragdon formation of Mississippian age. This formation is highly fractured, faulted, and folded, increasing its susceptibility to erosion.

The Jurassic Mule Mountain stock covers about 20% of the geology within Whiskeytown National Recreation Area and is stratigraphically above and in unconformable contact with the Bragdon formation. The Mule Mountain stock is very unstable due to the highly fractured, faulted, and folded history and post-emplacement albitazation**.**

The youngest non-Quaternary rock is the Cretaceous Shasta Bally batholith and associated dike intrusions that cover about 35% of the park. A large zone (70% within the park) of the batholith has a very high ratio of biotite to hornblende and is extremely erosive. Several dikes occur within Whiskeytown National Recreation Area are a result of emplacement of the batholith.

Whiskeytown National Recreation Area has a long history of placer and ore mining that dates back to the 1850s. Two past igneous events, emplacement of the Mule Mountain stock and Shasta Bally batholith, created conditions for gold and base metal ore deposits. These deposits are not just within Whiskeytown National Recreation Area, but are also exposed just outside of the park boundary.

Soils

The soils within Whiskeytown National Recreation Area are typical of soil formation within the Eastern Klamath Metamorphic Belt of the Klamath Geologic Province with the exception of soils formed on the Shasta Bally batholith. Generally, soils within Whiskeytown National Recreation Area can be described according to parent material, elevation, slope, and vegetation cover. The general Great Soil Groups in Whiskeytown National Recreation Area as defined by the Natural Resource Conservation Service (formerly the Soil Conservation Service) consist of entisols, inceptisols, spodosols, alfisols, and limited mollisols. More specific soil descriptions vary depending on localized conditions.

The higher elevation steep slopes (greater than 30°) have poorly developed soils described as entisols and inceptisols. More specifically, the decomposed granite entisols of the Shasta Bally batholith, which forms most of the high elevations on the south side of Whiskeytown National Recreation Area, can be described as having no soil horizons except for areas with vegetation laying on top of the decomposed granite. The inceptisols tend to be found on less steep slopes with vegetation and exhibit a higher degree of soil formation than the entisols; usually having organic material incorporated and exhibiting weak horizon formation.

The lower elevations of Whiskeytown National Recreation Area tend to have less steep slopes (less than 30%) with a mix of a variety of conifer species, oak woodlands, and chaparral. Here, soils have greater horizon formation than the entisols and inceptisols. Typical of these environments, spodosols and alfisols form depending upon the local vegetation cover. The spodosols form in more acidic conditions inherent to coniferous vegetation and the alfisols form in less acidic conditions in oak woodland and chaparral vegetation. The mollisols form in grassland environments.

Water Quality

Whiskeytown National Recreation Area is noted as a water-based recreation area with significant year-round water resources that attract many visitors. Whiskeytown Lake covers 3,220 surface acres with 240,000 acre-feet of water at full capacity lying 1,210 feet above sea level. Whiskeytown Dam impounds the Clear Creek watershed on the southeast end of the recreation area and the lake is fed by seven major watersheds: Clear Creek, Brandy Creek, Crystal Creek, Boulder Creek, Mill Creek, Willow Creek, and Whiskey Creek. During the dry summer months, Whiskeytown Lake receives most of is water from Trinity Lake via a 17-mile underground tunnel which empties in Whiskeytown Lake at the Carr Powerhouse at a maximum rate of 3,200 cubic feet per second. Below the dam, the major tributary to Clear Creek is Paige Boulder Creek which drains into Clear Creek about one mile downstream from the Whiskeytown Dam. Additionally, many intermittent streams drain into Whiskeytown Lake. Several streams, most notably Cottonwood Creek, drain outside of the Clear Creek watershed. Whiskeytown Lake supplies power generation at the Spring Creek Powerhouse along the Sacramento River via an underground tunnel, irrigation for the California Central Valley crops, and drinking water for the Lower Clear Creek Water District.

Water quality within the park is generally of very high quality, although some watersheds on the north side of the lake are affected by acid mine drainage from past mining practices. The streams on the southern side of the recreation area flow through virtually pristine watershed conditions with a large snow pack component from the higher elevations. Baseline data for the south side is gathered at a water quality monitoring station on Paige-Boulder Creek which is considered a ‘pristine’ creek. The monitoring station gathers the following data: pH level; specific conductivity; temperature; dissolved oxygen; turbidity; and, stage of flow.

Paige-Boulder Creek is considered representative of the park’s south side streams including Crystal Creek, Brandy Creek, Mill Creek, and Boulder Creek. The specific conductivity of Paige-Boulder Creek ranges from 30-150 mmhos with an average of about 50 mmhos. The pH ranges from about 7.2 to a maximum of 8.2 with an average around 7.7. Turbidity ranges from 0-100 NTU and averages about 2 NTU and dissolved oxygen is considered to be at saturation level and ranges from 9-12 mg/l. Temperature ranges from -1 to 25°C. These range values are seasonal and fluctuate with precipitation. The south side drainages are impacted from past timber harvest activities which have the potential to increase turbidity in the watersheds as the old logging roads deteriorate, introducing sediments into the system.

Watersheds on the north side of Whiskeytown National Recreation Area all have past mining activities that have impaired or have the potential to impair water quality. Base metal and gold mining inside and outside of the park boundaries has left a legacy of acid mine drainage problems and currently the National Park Service is quantifying the extent of the damage to these watersheds which include Willow Creek and Whiskey Creek and other smaller tributaries. Willow Creek, which has its headwaters to the west of Whiskeytown National Recreation Area, and

enters Clear Creek near the Tower House District is listed on the California State 303d list for non-attainment of water quality standards. Large amounts of iron, zinc, aluminum, and lesser quantities of cadmium and other metals drain from the old Greenhorn Mine into Willow Creek and the waters of Whiskeytown Lake.

Many of the drainages within the park have been sampled for water, sediments, and biota in one or more years (2001-2003) as part of an integrated study conducted by the USGS-Water and Biological Resources Disciplines and the University of Montana, in cooperation with Whiskeytown National Recreation Area. This study has determined that heavy metals have bioaccumulated in fish, amphibians, and benthic macroinvertebrates in the Clear Creek watershed and within the park. In some areas, metals are at concentrations toxic to aquatic life (Moore, 2002; Roger Hothem USGS BRD, personal communication), threatening Whiskeytown's federally listed anadromous fish and fish-eating mammals and birds.

The sampling of fine-grained sediment in the Clear Creek basin demonstrated that tributaries flowing into Whiskeytown Lake are highly elevated in several metals, especially arsenic, cadmium, chromium, copper, mercury, and zinc (Moore 2002). Specifically, these results indicate that these streams have elevated levels of arsenic and mercury in fine sediments. Sediment metals contamination at this level can stress ecosystems by direct toxic effects and long-term disruption of productivity/reproduction. Several taxa of invertebrates and fish collected from these sites contained elevated concentrations of arsenic, chromium, nickel, lead and/or mercury.

In the park, there is some limited semi-quantitative data on the lake sediments and invertebrates (May et al., 2001). Samples were found to have concentrations of arsenic and nickel higher than USEPA Probable Effects Levels (May et al., 2001). They also found elevated concentrations of cadmium and selenium in invertebrates. Pathways for metals into aquatic organisms can be through water or sediments and the amount of bioconcentration or biomagnification is dependent on the metal and ecosystem involved. Certain metals, such as mercury, highly bioconcentrate and have major effects even at relatively low concentrations. Others, such as arsenic do not readily bioconcentrate and must reach higher levels to cause noticeable effects to biota or humans consuming that biota (e.g., fish).

Biological impairment of Whiskeytown Lake in the form of fecal coliform and E. coli has been identified at three of the swim beaches, Oak Bottom, East Beach, and Brandy Creek, during summer recreational periods. These occurrences are extremely rare and are not seen as chronic problems. Because of these isolated incidents, Whiskeytown Lake has been added to the California State 303d list non-attainment of water quality standards.

Wetlands/Floodplains

The entire shoreline of Whiskeytown Lake is considered an artificial wetland because of the seasonably-stable height of the lake and its associated vegetation. Operation of the lake by the U.S. Bureau of Reclamation (BOR) maintains two seasonal shorelines: full pool at 1,210 feet above sea level during the summer and a winter-season pool of approximately 1,193 feet. The standard operations of the BOR raises the lake elevation in April or May for the summer to accommodate recreation and lowers the level in October or November for winter flood protection of the Sacramento River. These two discrete water levels form a seasonal zone of inundation that fluctuates fifteen to twenty feet vertically and about forty to fifty feet horizontally, based on an average shoreline slope of twenty to twenty five degrees. Other smaller wetlands occur locally along streams both above and below Whiskeytown Dam.

When Whiskeytown Dam was constructed in the mid 1960s, it impounded Clear Creek, which altered the traditional hydrologic response of Clear Creek and the tributary creeks many miles above and below the dam. Clear Creek now only has a functional floodplain for about two miles as it enters the park's northernmost boundary. The historic pre-dam floodplain below the dam is no longer functional because of the diminished releases. The existing floodplain is overgrown with riparian vegetation and the creek is incised within its channel. Other floodplains exist at the

lake confluence with Brandy Creek and Boulder Creek and at the confluence of Clear Creek and Paige-Boulder Creek. Wetlands in these areas of the park have never been delineated.

Biological Resources

Vegetation and Plant Communities

Whiskeytown National Recreation Area lies at the juncture of several of northern California's physiographic regions and is one of the most floristically diverse ecological units in the western United States. The diverse plant communities gradually blend with one another in such a way that distinct boundaries are seldom observed. The patchy vegetation pattern reflects a broad range in elevation, rugged topography, diverse soil types, and history of natural and human disturbance. Most vegetation in the park was cleared or otherwise affected by historical land use practices.

For the purposes of this Environmental Assessment, these diverse habitats have been grouped into the potentially affected vegetative communities present in or near portions of the proposed Shasta-Trinity Trail alignment within Whiskeytown National Recreation Area. The communities are based on descriptions by Biek (1988) and Sawyer and Keeler-Wolf (1995), as well as the Alliance/Association system of classification developed by the Ecological Society of America as part of the U.S. National Vegetation Classification effort.

The plant communities described below are: Mixed Conifer, Douglas fir, Ponderosa Pine, Knobcone Pine, Grey Pine, Black Oak, Interior Live Oak, Canyon Live Oak, Blue Oak, Tanoak, Chaparral and Riparian Communities. The following sections describe the plant communities, their distribution, and typical plant species.

Mixed Conifer
The mixed conifer community covers approximately 10,000 acres mostly on north and east facing slopes, and occurs primarily above 3000 foot elevations. This community is found largely in Section 2 of the proposed Shasta Trinity Trail. Ponderosa pine or white fir (*Abies concolor*) typically provide at least 20% relative cover in the tree layer. Other common species include incense cedar (*Calocedrus decurrens*), Douglas fir, and sugar pine (*Pinus lambertiana*). Subcommunities contain species that are less dominant but regionally plentiful such as white alder (*Alnus rhombifolia*), California yew (*Taxus brevifolia*), red fir (*Abies magnifica var. shastensis*) and Jeffrey pine (*Pinus jeffreyi*). Understory shrubs may be dense, sparse, or scattered and consist of tan oak (*Lithocarpus densisflorus vars. densiflorus* and *echinoides*), chinquapin (*Chrysolepis sempervirens*), greenleaf manzanita (*Arctostaphylos patula*), pacific dogwood (*Cornus nuttallii*), western azalea (*Rhododendron occidentale*), snowbush (*Ceanothus cordulatus*), huckleberry oak (*Quercus vaccinifolia*), and sierra gooseberry (*Ribes roezlii*). The ground cover in the mixed conifer plant community is comprised of grasses, ferns, sedges, and some of the park's most unique herbaceous species such as parsley fern (*Cryptogramma acrostichoides*), twinflower (*Linnea borealis var. longifloria*), and bride's bonnet (*Clintonia uniflora*). The forest floor vegetation layer consists of low-growing lichens and mosses. A prime example of the mixed conifer community is found along Crystal Creek Road, from above the Crystal Creek Regional Boys Camp to Coggins Park. The unlogged areas at Coggins Park demonstrate a mixed conifer forest community that probably covered most of the higher elevation mountain slopes before they were logged. Jeffrey pine and white fir are found on the upper slopes of Shasta Bally, with the east side favoring Jeffrey pine. A few acres at the summit of Shasta Bally have a significant amount of red fir.

Douglas fir
This community occasionally contains Douglas fir (*Pseudotsuga menziesii*) as the sole or clearly dominant tree in the canopy where Douglas fir comprises a minimum of 75% relative canopy cover. The understory is very open with very few species present. Ponderosa pine, canyon live oak, black oak, and tan oak may also be present. This alliance is uncommon and found only on

northerly slopes in scattered locations, mostly above 2500 feet. More commonly seen along or near stream banks is the codominance of Douglas fir and tanoak or Douglas fir and canyon live oak. These are fairly common along Boulder Creek, Mill Creek and Brandy Creeks. Big-leaf maple (*Acer macrophyllum*), white alder, and blackfruit dogwood (*Cornus sessilis*), black oak and tanoak may also be present in the tree layer. The shrub layer may contain California aralia (*Aralia californica*), pacific blackberry, poison oak, giant chain fern (*Woodwardia fimbriata*), and bracken fern. The herb layer may contain such species as horsetail (E*quisetum arvense*), Indian rhubarb, pacific starflower (*Trientalis latifolia*), and wild mint (*Mentha arvensis*).

Ponderosa pine
This community covers approximately 10,000 acres in the park and sometimes has ponderosa pine as the sole, dominant overstory tree with douglas fir, canyon live oak or interior live oak also present in the canopy. Numerous other tree species that may be present include pacific dogwood, knobcone pine, blue oak, incense cedar and sugar pine. Ponderosa pine contributes less canopy cover than the hardwoods, which grow in a tier below the conifers. Black oak is co-dominant with ponderosa pine in many areas, and ponderosa pine often commingles with mixed oak woodlands. Shrub species that are common within this alliance include poison oak, toyon, and whiteleaf manzanita. Other shrubs that may occur include bracken fern, snowdrop bush (*Styrax officinalis*), toyon, lemon ceanothus, deer brush (*Ceanothus integerrrimus*), sword fern (*Polystichum munitum*), and pacific blackberry. Herb species that may occur include spreading dogbane (*Apocynum androsaemifolium*), California pipevine (*Aristolochia californica*), bedstraw, Iris species, snowberry, fescue (*Vulpia microstachys*), silver hairgrass, western needlegrass (*Achnatherum occidentale*), yerba santa (*Eriodictyon californicum*), narrowleaf mule ears (Wyethia angustifolia), false foxtail fescue (*Vulpia myuros var. myuros),* and field hedge parsley (*Torilis arvensis*). This vegetation alliance is common at elevations ranging from 2000 to 3500 feet, on the slopes above Brandy Creek, along the Mill Creek Trail, along the Crystal Creek Water Ditch Trail, along Boulder Creek, south of Shasta Bally Rd and on Monarch Mountain.

Knobcone Pine
This vegetation community has knobcone pine (*Pinus attenuata***)** as the sole or dominant species in the tree canopy. Knobcone pine comprises at least 10% relative cover in the tree canopy and emerges above the other trees, creating a two-tiered canopy. This alliance is also marked by having a preponderance of shrub cover and typically contains lemmons' ceanothus (*Ceanothus lemmonii*), whiteleaf manzanita, toyon (*Heteromeles arbutifolia*) and poison oak (*Toxicodendron diversilobum*) which provide 45-75% absolute cover. Other tree species vary but typically black oak (*Quercus kelloggii*), canyon live oak (*Quercus chrysolepis*), and interior live oak (*Quercus wislizeni*) may be present. Herbaceous cover is extensive and species rich and may include large, continuous areas of silver hairgrass (A*ira caryophyllea*) as well as small amounts of such species as Klamath weed (*Hypericum perforatum*), goldwire (*Hypericum concinnum*), creeping snowberry (*Symphoricarpos mollis*), bedstraw (*Galium bolanderi*), mule ears (*Wyethia glabra*), buckwheat (*Eriogonum spp*.), bracken fern (*Pteridium aquilinum var. pubescens*) and everlasting (*Antennaria spp*. and *Gnaphalium spp*.) and western needlegrass (*Achnatherum occidentale*). This alliance is common within WNRA and occurs primarily on south-facing slopes with gentle gradients, frequently near Whiskeytown Reservoir. Knobcone pine communities can be seen along the Mt. Shasta Mine Loop Trail, the Whiskey Creek area, and along Mule Town Road toward the town of Shasta. Knobcone pines are not restricted to serpentine soils at Whiskeytown National Recreation Area as they are in much of their natural range.

Grey Pine
Grey pine *(Pinus sabiniana)* is dominant within the tree canopy in this community, generally with sparse tree cover and dense shrub cover, primarily whiteleaf manzanita. Canyon live oak is normally present as well. Black oak, interior live oak, and California buckeye (*Aesculus californicus*) may also be present in the tree layer. Toyon, poison oak, snowdrop bush and lemon ceanothus are often present in the shrub layer. Silver hairgrass, bedstraw, field hedge parsley (*Torilis arvensis*), snowberry, and false foxtail fescue are often present in the herb layer. This community is common within the lower elevations of WNRA and occurs mostly on east and southeast facing slopes.

Black Oak
This community may have black oak as the sole important tree in the canopy providing at least 50% relative cover or it can share importance with canyon live oak or Douglas fir. Shrub species that are typically present include poison oak, whiteleaf manzanita, toyon, redbud (*Cercis occidentalis*), and snowdrop bush. Herb species that are often present include bedstraw, western needlegrass, snowberry, and iris species. This alliance is most common north and west of Whiskeytown Reservoir, although it also occurs along the southeast side of the reservoir, just northeast of the dam. There are also patches along Mill Creek Road southwest of Carr Powerhouse and just west of Dry Creek Campground.

Interior Live Oak
This community has interior live oak alone or dominant in the tree canopy. Stands typically feature at least 75% relative cover provided by interior live oak in the usually sparse tree layer. Other tree species that may be present include canyon live oak, California buckeye, blue oak, and grey pine. Shrub species that are normally present include poison oak, snowdrop bush, toyon, chamise, and whiteleaf manzanita. Species in the herb layer that are often present include yerba santa, yellow starthistle, field hedge parsley, false foxtail fescue, bedstraw, and silver hairgrass. This community is mostly found in the lowest elevations on southwest and southeast facing aspects.

Canyon Live Oak
This community is defined as having canyon live oak as the sole, dominant, or important tree in the canopy with madrone (*Arbutus menziesii*), tanoak, or sugar pine possibly present. Canyon live oak typically contributes at least 50% relative cover, and often more than 75%. Black oak is often also present in the tree canopy. Poison oak, whiteleaf and greenleaf manzanita, and toyon may be present in the shrub layer. This community is widespread throughout the park and occurs on all aspects and at all but the highest elevations.

Blue Oak
Blue oak grasslands cover approximately 400 acres within the park. Unlike the other plant communities, the blue oak grasslands appear to have distinct boundaries that may be a result of soil properties and past land use practices. The dominant species is blue oak (*Quercus douglasii*) associated with scattered gray pine and interior live oak. Shrubs are widely spaced and include manzanita, yerba santa, ceanothus, and poison oak. The ground cover includes annual and perennial grasses such as ripgut brome, dogtail grass, starthistle (*Centaurea solstitialis*), fescues, wild oat (*Avena fatua*), and nut sedge (*Cyperus strigosis*). The blue oak grassland community can be seen in distinct patches on the south-facing slopes along Highway 299 near Crystal Creek Road. Other areas include clearly defined zones along Muletown Road, toward the community of Igo.

Tanoak
This uncommon community is defined by a dominance of tanoak (*Lithocarpus densiflorus*) in the tree canopy, or a canopy that is composed purely of this species. In general, tanoak contributes at least twice as much relative cover as any other tree species. Other associated trees which may be present include pacific dogwood, and Douglas fir. Shrub and herb layers are relatively undeveloped in this vegetation type but may include poison oak, bracken fern, and California grape (*Vitis californica*). This community can be found in the lower reaches of Salt and Rich Gulches, and along Shasta Bally Road near the trailhead of the Upper Brandy Creek Falls Trail.

Chaparral
Chaparral plant communities cover approximately 8,000 acres in the park. The chaparral plant community varies in species composition and vegetation structure from distinct monocultures to combinations of shrub and small tree species that intergrade with other plant communities. Thick, leathery, oily leaves that form a highly flammable leaf litter layer characterize chaparral species. Such characteristics enable chaparral plant communities to withstand extremes in temperature and precipitation, as well as their periodic consumption by fire. This broad-leaved community is diverse, ranging from dense, impenetrable thickets to open, mixed shrub-oak woodlands.

Chaparral communities in the park are dominated by whiteleaf and greenleaf manzanita, ceanothus species, chamise (*Adenostoma fasciculatum*), toyon, yerba santa (*Eriodictyon californicum*), and poison oak. Whiteleaf manzanita often provides at least 50% relative cover Oak and pine species are also sparsely scattered throughout many of the drier areas and occur with some density on wetter sites and north and northeast facing slopes. A thick layer of leaf litter and lack of light result in a sparse herbaceous understory of species such as brodiaeas (*Brodiaea spp*.), wild onion (*Allium spp*.), chaparral honeysuckle (*Lonicera interrupta*), creeping sage (*Salvia sonomensis*), and Indian warrior (*Pedicularis densiflora*). Common exotic grasses include rye (*Lolium perenne*), cheatgrasss, and fescues (*Vulpia spp*.).

Typical low elevation chaparral communities are found on south-facing slopes north of Whiskeytown Lake and Highway 299 and are scattered throughout the park on dry sites at lower elevations. Chamise-dominated chaparral has a more limited distribution; typical populations can be found in the Whiskey Creek area and bordering the blue oak grasslands north of Highway 299 near Crystal Creek Road.

A montane chaparral plant community occupies the loose, sandy, granitic soils between the 3,000 foot elevation and the top of Shasta Bally. This montane chaparral is dominated by greenleaf manzanita, combined with pinemat manzanita (*Arctostaphylos nevadensis*), common manzanita (*A. manzanita*), mountain whitethorn (*Ceanothus cordulatus*), huckleberry oak, and bush chinquapin. Understory species in this community are usually absent and this community appears to be the result of past crown fire in forest vegetation, as well as logging of mixed conifer forests at high elevations on highly erodible soils.

Riparian Vegetation
Whiskeytown National Recreation Area lies at the confluence of seven perennial tributaries that form one of the largest watersheds flowing into the Sacramento River. Riparian communities cover approximately 4,000 acres and vary in species composition and vegetation structure depending on elevation, steepness of slope, aspect, and quantities and timing of the water source. Tree species occurring on canyon slopes and seasonally-watered ravines primarily consist of Douglas fir, canyon live oak, dogwood, bigleaf maple (*Acer macrophyllum*), and scattered mixed conifers. On canyon bottoms, the lake edge, and moister sites, tree species include Fremont's cottonwood (*Populus fremontii*), black cottonwood (*Populus balsamifera ssp. trichocarpa*), willow (*Salix spp*.), white alder (*Alnus rhombifolia*.), and Oregon ash (*Fraxinus latifolia*). Often white alder is the sole or dominant tree in the canopy along with big-leaf maple or Douglas fir.

Appearance of the vegetation depends largely upon the stream where it is found; on smaller streams a hardwood canopy includes white alder, big-leaf maple, sandbar willow (*Salix exigua*), arroyo willow (*Salix lasiolepis*), and dogwoods (*Cornus spp*.), while larger streams typically feature a more open canopy with more widely spaced trees. Often these trees include, along with hardwoods, Douglas fir, and/or canyon live oak (*Quercus chrysolepis*) at the tops of steep bank slopes. The exotic Himalayan blackberry has invaded a significant portion of the riparian community. Other common exotic species include black locust (*Robinia pseudoacacia*), cut-leaf blackberry (*Rubus laciniatus*), plantains (*Plantago spp*.), and mulleins (*Verbascum thaspus* and *V. blattaria*).

Understory species are also quite variable. Native shrub species include California blackberry (*Rubus ursinus*), wild grape, western azalea (*Azalea spp*.), miner's dogwood (*Cornus sessilis*), spice bush (*Calycanthus occidentalis*), button willow (*Cephalanthus occidentalis var. californica*), snowberry (*Symphoricarpos albus var. laevigatus*), and California wild rose (*Rosa spp.*), with chaparral species such as buckeye and snowdrop bush mixed in along the periphery. The understory is a combination of Indian rhubarb (*Darmera peltata*), grasses such as slender hair grass (*Deschampsia elongata*) and rattlesnake grass (*Briza spp*.), Horsetails (*Equisitum spp*.), sedges, rushes, ferns, cattails (*Typha spp*.), and herbaceous species such as soaproot (*Chlorogalum pomeridianum*), California pipevine (*Artistolchia californica*), buttercups, (*Ranunculus spp*.), phacelia (*Phacelia spp*.), monkeyflower, smartweed (*Polygonum spp*.),

mugwort (*Artemesia douglasiana*), miner's lettuce (*Claytonia perfoliata* and *Montia parviflora*), self-heal (*Prunella vulgaris*), dock (*Rumex spp.*), and violets (*Viola spp*.).

A willow-scrub riparian plant community can be seen along upper Clear Creek, lower Clear Creek near Peltier Bridge Campground, and Willow Creek.

Sensitive Plant Species
National Park Service Management Policies and the Endangered Species Act mandate protection of special status plants and their habitats. The National Park Service is also responsible for providing information to the U.S. Fish and Wildlife Service on the status of candidate or proposed candidate plants within their jurisdiction. The implementation of inventory and monitoring protocols is required to collect this information.

An extensive floristic inventory of the park and collection of herbarium voucher specimens was initiated in 1986 by David Biek and completed with the assistance of the Shasta Chapter of the California Native Plant Society. Fifteen sensitive plants are known to occur in the park. Sensitive plant species are plants that are not officially listed as threatened or endangered by the State of California or the Federal Endangered Species Act, but warrant consideration and protection due to limited distribution, scarcity of individuals, or the likelihood of becoming listed as threatened or endangered. These fourteen plants and their current status are detailed in the California Native Plant Society publication "Inventory of Rare and Endangered Plants of California, sixth edition", 2001.

There are no known state or federally-listed threatened or endangered plants in the park, although blue elderberry is host to the federally-listed threatened valley elderberry longhorn beetle, and the elderberry must be protected as if it were listed. Plant species of special concern (threatened, endangered, candidate, or sensitive species) found in the park include: Howell's alkali grass (*Puccinellia howellii*), Shasta County arnica (*Arnica venosa*), clustered lady's slipper (*Cypripedium fasciculatum*), western trillium (*Trillium ovatum*), Sanborn's onion (*Allium sanbornii ssp. sanbornii*), Tehama navarretia (*Navarretia heterandra*), yellow triteleia (*Triteleia crocea Greene var crocea*), Sanford's arrowhead (*Sagittaria sanfordii*), small spikerush (*Eleocharis parvula*), three-bracted onion (*Allium tribracteatum*), Mildred's clarkia (*Clarkia mildrediae*), Sierra clarkia (*Clarkia virgata*), *Leptosiphon rattanii*, red-anthered juncus (*Juncus marginatus*), and canyon stonecrop (*Sedum paradisum*).

None of these species of special concern are known to occur in the Shasta-Trinity Trail project area. Workers would be instructed to look for these plants. Work would be stopped and mitigation measures would be implemented to protect these or other plants of special concern discovered during project work.

Survey and inventory work on these sensitive plants was initiated in 2000 for the first time since the 1980's. Two species, Shasta County arnica and Howell's alkali grass have been monitored sporadically for several years. Sporadic monitoring is ongoing for both species, using protocols developed by the park.

Shasta County arnica (*Arnica venosa*) is a plant limited in distribution known to occur only within a 35-mile radius area around Shasta Lake, Trinity Lake, and Whiskeytown Lake. Monitoring from 1992 to 2001 indicated that populations are increasing or remaining stable. The plant seems to prefer disturbed areas like road cuts and fuel breaks with a north or northeast aspect.

Howell's alkali grass (*Puccinellia howellii*), a rare grass whose only known global location is in Whiskeytown National Recreation Area, was recognized as a distinct species in 1989 and little is known about its biology and ecology. Some studies have been completed that are available at the park for review. Current research is expected to result in definitive data concerning the physical and chemical properties of the springs. The grass appears to be an obligate wetland species and the only known worldwide population is unevenly distributed within a complex of three mineral springs at an elevation of approximately 1,350 feet. Realignment of Highway 299 in 1991 destroyed 1,200 square feet of plants and habitat and may have altered the hydrology of the

springs. The proximity of the grass to the highway means it is potentially subject to high severity events such as hazardous material spills that could eliminate all or a major portion of the population and/or its habitat. This species could be considered stable and sustainable only if additional populations are discovered in other protected locales. To preclude Federal listing as threatened or endangered, the National Park Service and U.S. Fish and Wildlife Service developed a Conservation Agreement in cooperation with the California Department of Transportation and the California Department of Fish and Game. The Conservation Agreement outlines protection measures to be implemented, the contributions of each agency, and provides for listing the species as Endangered if the conservation agreement fails to result in adequate protection.

Two additional species of concern within the park include blue elderberry (*Sambucus mexicana*) and McNab Cypress (*Cupressus macnabiana*). Although McNab Cypress is not listed as threatened, endangered, or sensitive by federal or state governments or the California Native Plant Society, the park considers McNab Cypress to be a species of concern due to its limited range and recent decline in the park. Whiskeytown National Recreation Area is the northernmost extension of McNab cypress and the type location for the species. According to Biek (1988), a grove of McNab Cypress grew on metavolcanic rock along Clear Creek downstream from the historic town of Whiskeytown. This area is now beneath the waters of Whiskeytown Lake. Anecdotal information indicates a few specimens were transplanted to various locations in the park and to two residences in the towns of French Gulch and Redding. One specimen that appears to be naturally recruited is found near Clear Creek near the Tower House Historic District. There were a number of others scattered around the park. Three of these specimens remain; the others have been inadvertently removed by work crews, died from probable development impacts, or appear to be dying as a result of being trimmed. Of the three remaining specimens, two are near failure from slumping and are threatened by a restoration project. McNab Cypress is exceedingly difficult to propagate but several have been successfully grown from seed and are being planted in appropriate areas in the park. These appear to be doing well and the park will continue to propagate and plant this unusual and uncommon tree.

Blue elderberry is a species of concern because it is the host plant for the federally-listed threatened valley elderberry longhorn beetle. Several elderberry shrubs grow near Trinity Mountain Road along Clear Creek. The park is required to protect the elderberry in accordance with guidelines provided by the U.S. Fish and Wildlife Service.

Invasive Plant Species

Numerous exotic or alien plant species have become established in some areas of the park and exotics currently account for approximately 25-30 percent of the plants in the park. Many exotic plants are highly invasive, able to out-compete native species, and disrupt native plant communities and processes. An accurate and complete assessment of the abundance and extent of exotics in the park was completed in 2003. Several infestations have been successfully treated and control efforts for the next several years are expected to achieve a significant reduction in exotic plant populations in the park. Treated areas will require monitoring and re-treating indefinitely. The park works cooperatively with the Shasta County Weed Management Area to eradicate exotics across boundaries.

Mandates that require direct action to monitor and control the spread of exotics include the 1916 National Park Service Organic Act, the General Management Plan for Whiskeytown National Recreation Area (2001), and agency-wide policy document National Park Service-75 (1992). Changes in vegetation resources must be observed and documented in order to interpret and analyze such changes as the basis of informed decisions.

The goal of the exotic plant program is to reduce exotic pest plant populations in the park and allow re-colonization by native species. Developed areas along main roads are currently being treated and back country sites will be treated secondarily, working from the least to the most infested areas, which has been shown to be the most effective method (Fuller and Barbe 1985). Within Whiskeytown National Recreation Area there are 195 known exotic plants, of which seventeen are considered invasive and subject to eradication. The priority invasive species are:

tree of heaven (*Ailanthus altissima*), giant reed (*Arundo donax*), tumbling oracle (*Atriplex rosea*), yellow star thistle (*Centaurea solstitialis*), bull thistle (*Cirsium vulgare*), field bindweed (*Convolvulus arvensis*), scotch broom (*Cytisus scoparius*), french broom (*Genista monspessulana*), english ivy, (*Hedera* helix), himalaya berry (*Rubus discolor*), spanish broom (*Spartium junceum*), medusa head (*Taeniatherum caput-medusa*), salt cedar (*Tamarix chinensis*), moth mullein (*Verbascum blattaria*), common mullein (*Verbascum thapsus*), prickly lettuce (*Lactuca serriola*)and vinca (Vinca major). Although exotic plant surveys have not occurred along new or re-routed trail alignments in Alternatives B and C, several exotic plant species are known to exist in the areas through which the new or re-routed trails will pass: star thistle, bull thistle, french broom, himalaya berry, and common mullein.

Ecologically Critical Areas
The following four areas are considered to be ecologically sensitive since they embody unique and special resource values found in the park. Three of these areas could be affected by the actions described in this Environmental Assessment.

Mineral springs
One of the most unique and ecologically sensitive areas within the park is a complex of three noncontiguous mineral springs that occur between a 1,200 foot segment of Willow Creek and Highway 299. Despite extensive surveys, this is the only known global location Howell's alkali grass, an obligate wetland grass species that appears to have specific microhabitat requirements to the alkali water that seeps from the skeletonized soils and rock outcrops. The USFWS has stated that this species is quite likely to be the most threatened species in northern California. Aside from being critical habitat for Howell's alkali grass, this site is recognized as being of considerable importance to wildlife, with species of concern such as Pacific fishers, band-tailed pigeons, and foothill yellow-legged frogs known to use the site. The mineral springs have been listed by the State of California as a Significant Natural Area (SHA-41).

Old growth
The sections of un-logged, old-growth forest in the park constitute ecologically sensitive areas with unique aesthetic and natural resource values. These old growth forests represent those that covered the mountain slopes prior to logging and provide an intact and relatively undisturbed habitat for flora and fauna that are threatened throughout the Klamath Mountains. The old growth sections may be a close representation of desired future conditions in mixed-conifer and ponderosa pine forests in the park.

Perhaps the greatest threat to the old-growth forests is the unnatural accumulation of ladder fuels due to fire suppression. Significant soil disturbance is another concern, due to the steep topography and highly erodible soils. Some old-growth areas qualify as critical habitat for goshawks, numerous amphibians, and the federally-listed (threatened) spotted owl. Some unique plant species are found in old-growth sections such as yellow tritieleia, Salmon Mountains wakerobin, phantom orchid, spotted coral root, rattlesnake plantain, tiger lily, white-flower bog orchid, and broadleaf twayblade.

Riparian habitats
Riparian plant communities provide wildlife corridors and habitat for aquatic species of plants, animals, and invertebrates. Biodiversity, water quality and quantity and recreation values are provided and enhanced by riparian areas.

About 4,000 acres (1,619 ha) of riparian habitat occur in the park, ranging from headwaters at the top of Shasta Bally at 6,209 feet (1,893 m) to the bottom of the Clear Creek valley around 700 feet (213 m). Since this community type spans across most elevations in Whiskeytown, the composition of species varies both along creeks and between them, adding greatly to park biodiversity. Riparian plant communities provide wildlife "travel corridors" and habitat for aquatic species of plants, animals, and invertebrates.

Shasta Bally Summit
This area is located on the east side of the summit in a shallow bowl which is surrounded by red fir, where deep snow accumulates in the winter. This area is ecologically sensitive and highly susceptible to disturbance. However it is not within the realm of this project so will not be impacted in any way. The plant community which occupies the top of Shasta Bally is considered by park staff to be delicate and diverse, both of which make its preservation important. Within the United States, this plant community has been ranked as having the highest number of endemic conifer species.

Wildlife and Fish

Whiskeytown National Recreation Area supports an abundant and diverse wildlife community, which reflects the diversity of the vegetative communities in the park. More than 200 vertebrate species are known to occur in the park, including at least 35 mammal species, 150 bird species, and 25 reptile and amphibian species. Additional species are likely to be confirmed in the park as wildlife inventories become more complete. The perpetuation of relatively intact wildlife populations within the park is partially dependent on the ability of public and private land managers to ensure that adequate habitat is protected in and around the park boundary.

Whiskeytown Lake and its tributaries support a large variety of fish, both native and exotic. Fish present at Whiskeytown National Recreation Area include rainbow trout (*Salmo gairdnerii*), largemouth bass (*Micropterus salmoides*), smallmouth bass (*Micropterus dolomieui*), spotted bass (*Micropterus punctulatus*), Kokanee salmon (*Oncorhynchus nerka kennerlyi*), chinook salmon (*Onchorhynus tshawytscha*), bluegill (*Lepomis macrochirus*), black crappie (*Poxomis nigromaculatus*), brown trout (*Salmo trutta*), brook trout (*Salvelinus fontinalis*), channel catfish (*Ictalurus punctatus*), brown bullheads (*Ictalurus nebulosus*), Sacramento squawfish (*Ptychocheilus grandis*), hardhead (*Mylopharodon conocephalus*), green sunfish (*Lepomis cyanellus*), western suckers (*Catostomus occidentalis*), and riffle sculpins (*Cottus gulosus*). The California Department of Fish and Game regularly stocks rainbow trout and brook trout in Whiskeytown Lake and some of the perennial streams during the spring and summer months. The lake has also been historically stocked with brown trout and kokanee salmon.

Special Status Fish and Wildlife Species
Whiskeytown National Recreation Area has a responsibility to protect and perpetuate sensitive, unique, rare, threatened, or endangered fauna. Good data exists documenting most rare, threatened, or endangered animals. The following are special status fish and wildlife species known to occur within WNRA:

Spring-run chinook salmon and Central Valley steelhead trout
Two federally Threatened fish species occur in Clear Creek below Whiskeytown Dam. These are the spring-run chinook salmon (*Oncorhynchus tshawytscha*) and Central Valley (Evolutionary Significant Unit) steelhead trout (*Onchorynchus mykiss*). The removal of McCormick-Saeltzer Dam on lower Clear Creek in the fall of 2000 has allowed these two species access to the upper reaches of Lower Clear Creek. These anadromous fish are now utilizing portions of lower Clear Creek within Whiskeytown National Recreation Area for spawning.

Whiskeytown National Recreation Area contains two federally Threatened wildlife species, the northern spotted owl (*Strix occidentalis caurina*) and the bald eagle (*Haliaeetus leucocephalus*) as well as a Candidate Species, the Pacific fisher (*Martes pennanti*). The valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*), a federally threatened species, has not been reported in the park, however, a small stand of blue elderberry, the host plant for the beetle, is present along Trinity Mountain Road near the park boundary.

Bald eagle
Whiskeytown Lake supports two breeding pair of bald eagles as well as a substantial migratory wintering population. Bald eagle activity such as perching, foraging, nesting, and roosting is generally limited to the lower elevations of the park and occurs mostly within two miles of Whiskeytown Lake. Bald eagles are dependent on large, dominant trees for nesting and

perching. The majority of foraging activity occurs on Whiskeytown Lake and prey species include a wide variety of fish as well as numerous ducks, coots, and grebes.

Bald eagles were first documented as nesting at Whiskeytown Lake in 1973. The goals of bald eagle management at Whiskeytown National Recreation Area are to protect nesting bald eagles from disturbance and to maintain and enhance bald eagle habitat. The National Park Service restricts visitor use within ½ mile of bald eagle nest sites during the nesting season to prevent unnecessary disturbance and the potential for nest abandonment. Some trails that have been temporarily closed to visitor use in the past due to bald eagle nesting attempts include the Davis Gulch Trail, Boulder Creek Trail, and Peltier Trail.

Whiskeytown National Recreation Area's two nesting pairs of bald eagles were monitored for nesting success sporadically from 1979 to 1986. Bald eagles have been closely monitored for nesting success and productivity since 1986. Areas of the park that contain potential bald eagle nesting habitat are surveyed annually for potential new nesting territories. California Department of Fish and Game Bald Eagle Nesting Territory Report Forms are completed at the end of each nesting season. Additionally, the park participates in the annual USFWS mid-winter bald eagle survey.

Northern spotted owl

The northern spotted owl is found throughout much of northern California in dense old-growth, multi-layered mixed conifer, redwood, and Douglas-fir habitats, from sea level up to approximately 7600 ft. (Zeiner et al. 1990). The western area of the park falls within the reported range of the northern spotted owl and contains some areas of suitable habitat. Forested areas with greater that 70% canopy closure are potential spotted owl nesting and roosting areas, while areas with greater than 40% canopy closure provide foraging areas. Old growth forests provide the best habitat. Most spotted owl habitat owes its structure and species composition to fire (Lujan 1992). Historically, spotted owls occupied a dynamic landscape that often consisted of large areas of burned and unburned forest. Today, however, habitat is greatly reduced and fragmented, and owl populations have become increasingly vulnerable to loss of habitat due to fire (Lujan 1992). Fires can cause further habitat fragmentation and loss of preferred suitable old growth. One study showed that areas that had been clearcut or burned within the previous 20 years were rarely used by spotted owls for foraging. Additionally, spotted owls usually avoided crossing burned areas by traveling through corridors of unburned timber around the area.

Spotted owls are also intolerant of high temperatures and are stressed at temperatures above 80 to 87 degrees Fahrenheit (27-31 deg. C) (Gutierrez 1985). Spotted owls tend to roost in small trees in the forest understory during warm weather and high up in the large trees during cold or wet weather. The layered canopy structure in old forests provide both types of roosts. (Thomas et. al. 1990). There is one known spotted owl site within the park, but more sites may be found as surveys are completed in some of the more remote areas of the park. Much of the higher elevations along the western boundary of the park that historically may have supported spotted owls was heavily altered by timber harvest activities in the 1960’s and early 1970’s. It is possible that these areas will be repopulated by spotted owls as the forest regenerates, matures and develops the complex structural characteristics commonly found in areas occupied by spotted owls.

A single pair of nesting northern spotted owls with two fledglings was discovered in the summer of 1994. The activity center has been be monitored annually since this time and records are kept detailing nesting location, status, and production. WNRA is located on the edge of the range of the northern spotted owl and some suitable habitat exists in the higher elevations along the western and southern park boundary. Generally, suitable habitat for the spotted owl is rarely encountered at WNRA below 3000 feet in elevation. The detection of additional pairs of northern spotted owls is possible as all areas containing suitable habitat have not yet been surveyed. Most areas containing suitable habitat that have not been surveyed are in the more remote areas of the park. The USFWS is consulted, under Section 7 of The Endangered Species Act, prior to development or habitat manipulation in areas meeting the criteria for suitable spotted owl habitat.

Pacific fisher
The Pacific fisher (*Martes pennanti*) is a Candidate Species under the Federal Endangered Species Act. Fishers are known to be among the most habitat-specific mammals in North America, living in landscape mosaics of conifer-dominated forest stands, and avoiding open areas that have no overstory or shrub cover. Late successional mid to low elevation coniferous or mixed forests provide the most suitable habitat because they provide abundant potential den sites and prey. The presence of large deciduous trees, such as oaks, also appears to be important. Fishers den in a variety of protected cavities, brush piles, logs, or under an upturned tree. Hollow logs, trees, and snags are especially important habitat components. Forest type is probably not as important to fishers as structural characteristics, such as dense canopies, and large trees, snags, and down logs. Riparian areas are also important. Fishers may be extirpated from much of their historical range in Washington, Oregon, and California. Trapping at the end of the 19th century severely reduced fisher populations, but the reasons for the lack of recovery in the species in the absence of trapping are unclear. Factors may include loss of suitable habitat from logging and fire suppression, fragmentation of habitat, and disturbance and mortality from roads. Distribution and populations of fishers are not known at Whiskeytown, but the Wildlife Observation Database, dating from the early 1970's to present, reports numerous fisher observations throughout many areas of the park. It is likely that fishers occur within most habitat types present at Whiskeytown National Recreation Area with the exception of areas dominated by dense stands of chaparral.

Species of Concern
The park also contains twelve federally-listed Species of Concern. Those species are: foothill yellow-legged frog (*Rana boylii*), northwestern pond turtle (*Clemmys marmorata marmorata*), tailed frogs (*Asaphus truei*), northern goshawk (*Accipiter gentilis*), olive-sided flycatcher (*Contopus cooperi*), rufous hummingbird (*Selasphorus rufus*), red-breasted sapsucker (*Sphyrapicus ruber*), California thrasher (*Toxostoma redivivum*), long-eared myotis bat (*Myotis evotis*), fringed myotis bat (*Myotis thysanodes*), Yuma myotis bat (*Myotis yumanensis*) and the pacific western big-eared bat (*Corynorhinus townsendii townsendii*).

Cultural Resources

Cultural resources consist of archeological sites, historic structures, cultural landscapes, ethnographic resources, and museum objects. Archeological sites are the location of a significant event, prehistoric or historic occupation or activity, or a building or structure, whether standing, ruined, or vanished, where the location itself possesses historic, cultural, or archeological value. Historic structures are material assemblies that extend the limits of human capacity, and comprise such diverse objects as buildings, bridges, monuments, fences, and canals. Cultural landscapes are settings we have created in the natural world. They are intertwined patterns of natural and constructed features that represent human manipulation and adaptation of the land. Ethnographic resources are the basic expression of human culture providing the basis for continuity of cultural systems encompassing both the tangible (native languages, subsistence activities) and intangible (oral traditions, religious beliefs). These can include archeological sites, old ethnographic village sites, travel routes, fishing and hunting camps, locations of ceremonial significance, and areas traditionally used to gather resources. Museum objects consist of those constructions that are primarily artistic in nature or relatively small in scale. Although objects, by nature or design are moveable, they are associated with a specific setting or environment. No potential impact to museum objects is anticipated by this project and they are not discussed below.

Archeological Resources

Numerous archeological inventories have been completed covering approximately twenty-one percent of the park (8,900 acres) with 152 archeological sites currently recorded. Two prehistoric archeological districts within the park boundaries are listed on the National Register of Historic Places (NRHP) including Lower Clear Creek Archeological District (added 1979 - District -

#79003812) and the Tower House Archeological District (Tower House--Soo-Yeh-Choo-Pus) (added 1985 - District - #85003483).

Archeological investigations at Whiskeytown revealed Native American occupation spanning at least 8000 years (Bevill and Nilsson 2001). Prehistoric archeological sites at Whiskeytown consist almost exclusively of habitation sites and artifact scatters. The former are characterized by the presence of dark midden soil, house-pit depressions, diverse artifact assemblages, faunal remains, and, on occasion, human remains. Whereas habitation sites represent long-term seasonal or permanent use, artifact scatters are typically comprised of flaked stone tools and waste flakes, and sometimes ground stone that probably resulted from one or more occupational episodes. The distribution of prehistoric archeological sites at Whiskeytown appears to have been influenced by the occurrence of perennial or reliable intermittent water sources, with most sites found in close proximity to these sources. The majority of recorded prehistoric sites lie between 1000 and 2000 feet in elevation, although this may reflect survey coverage rather than actual settlement preferences.

Historic-period archeological sites at Whiskeytown consist of mining, homesteading, farming/ranching, and logging locations that date back to the California Gold Rush. These activities were initially fueled by the discovery of gold and are reflected by activities that date primarily to the Gold Rush period (1848-1843), the hydraulic mining period (late 1800s), the copper mining period (1884-1919), depression era occupation and mining (1930s), and late historic-period occupation (1940-1960s). Hamusek-McGann et al. (1999) evaluated eighteen mining sites throughout Whiskeytown in conjunction with an Abandoned Mineral Lands project. The Mount Shasta Mine, Oro Fino/Gentle Annie Mine, Monitor Mine, Desmond Mine and Ganim Mine were all formally determined to be eligible for the National Register.

The Lower Clear Creek Archeological District consists of six archeological sites located in the Clear Creek watershed below Whiskeytown Dam. The sites consist of prehistoric habitation areas that include house-pit depressions, midden soils, and associated artifact scatters. The primary significance of the district is in the potential for buried and surface deposits to provide comparative data that may contribute to the understanding of regional cultural prehistory, social organization, and the use of available biotic and abiotic resources.

The Tower House Archeological District consists of ten prehistoric sites including habitation locations and artifact scatters near the confluence of Clear, Willow, and Mill Creeks that date to the late prehistoric period (post 700 AD). Several archeological excavations have been conducted at sites within the district resulting in the recovery of thousands of artifacts. The district is significant in its' potential to provide data regarding the initial peopling of the area, interpretation of cultural prehistory and the effect of contact with Euro-americans.

Historic Structures

Relatively few historic structures are listed on the List of Classified Structures (LCS), most of which are found in the vicinity of the Tower House area. The Tower House Historic District is listed on the NRHP (added 1973 - District - #73000257). Centered on the confluence of Clear, Willow and Mill creeks, the district is composed of 14 individual features that encompass the period from about 1850-1920. Many of the features attributable to Tower and Camden were in an acute state of disrepair when the National Park Service took possession in the late 1960s. Restoration projects have rendered the Camden and Tenant houses habitable, and the grounds and other features cleaned up and variously restored.

The Tower House Irrigation System District consists of a water conveyance system that originates at Crystal Creek and flows east to the Tower House area. The Tower House Irrigation System District is listed on the NRHP as "Irrigation System (165 and 166)" (added 1974 - Structure - #74002359). Contributing elements include ditches, flumes, pipes, rock walls, a dam, a clean-out house, and redwood storage tank. The Tower House irrigation system is essentially in the same condition as the historic period of operation and is significant as an unique example of an irrigation system retaining much of its' historic integrity.

More recent structures and complexes, including the John F. Kennedy Commemorative Panel, Judge Carr Memorial, NEED Camp, and Central Valley Project features, have been recommended to lack National Register eligibility, often for failing to meet the 50 year-old minimum age requirement. Bevill and Nilsson (2001), however, recommended that some of these features be considered for significance due to the fact that many would soon be 50 years old, and for relation to bygone trends in local and/or national history. For example, the NEED Camp was born out of the cultural and intellectual renaissance of the 1960s. Implementation of the National Environmental Education Development (NEED) program led to the construction of many such environmental camps across the nation. Very few of these exist today, and only the NEED Camp, now called the Whiskeytown Environmental School, serves in its original capacity.

The Clear Creek Ditch, a forty mile-plus long water conveyance system constructed in the early 1850s, was evaluated in conjunction with a federal land exchange project east of Whiskeytown and determined to be National Register eligible (Bevill and Nilsson 2001). The ditch originates in Whiskeytown, and portions of it are maintained through use as a recreational trail. The Clear Creek Ditch is significant in both the scope of the construction implemented and its' contribution to the local economy.

Ethnographic Resources

No unequivocal ethnographic resources or Traditional Cultural Properties at Whiskeytown are listed on the National Register. However, the recently completed Ethnographic Overview and Traditional Use Study of Native American Affiliation at Whiskeytown identified a continuation of use and strong concern for the well being of natural and cultural resources in the park by the Wintu Indian community. The Wintu continue to utilize Whiskeytown for a variety of traditional purposes, including gathering (basketry materials, medicinal plants, religious purposes), subsistence activities (hunting and fishing), educational activities to promote traditional culture, and religious functions. More than 100 species of native plants are currently utilized by contemporary Wintu, many of which are found at Whiskeytown. The National Park Service is fully supportive of any management practices that enhance the viability of those resources (Emberson 2000).

While Wintu consultants have declined or are unable to provide specifics, a number of locations with cultural/spiritual significance ("sacred sites") are found at Whiskeytown (Emberson 2000). No extant Indian Trust Resources are found at Whiskeytown. However, Wintu families reportedly occupied several Indian Allotments within the park in the early to mid 1900s (Bevill and Nilsson 2001). Most of these were located along Clear Creek between the Tower House and Boulder Creek. The Wintu annually hold their Pe'Lane Bos educational camp at the Whiskeytown Environmental School for the purpose of educating children about traditional culture (Emberson 2000). The organizers have expressed interest in the continued existence of this camp in cooperation and conjunction with Whiskeytown staff.

Cultural Landscapes

The Tower House Historic District was listed on the NRHP (added 1973 - District - #73000257) and has subsequently been identified as a cultural landscape. The district includes the location of the Tower House Hotel that burned down many years ago, Camden House and associated out buildings now restored and used for interpretation, a footbridge behind the Camden House connecting it to a remnant apple orchard, the remnant apple orchard, a pasture at the south end of the apple orchard, Blacksmith Shop, Tower graveyard, Tenant House and Barn, the vehicle bridge, El Dorado Mine, the Kate Camden grave, and associated irrigation ditches (Tower House Irrigation System, Structure - #74002359). The district is significant as an example of an early enterprise providing for the well being of travelers during the gold rush period and conducting mining & logging operations in the vicinity, and later as a habitation site including orchards, pastures, and a tenant farm. The district also overlaps the prehistoric Tower House Archeological District (District - #85003483) and has the potential to contribute to our understanding of the effect of the contact period on Native American inhabitants.

Park Operations

Park operations that may be affected by the project include maintenance, law enforcement, and fire and emergency services. Each of these diverse areas of responsibility has important linkages to the creation, use, and maintenance of the Shasta-Trinity Trail System.

Maintenance

Currently, there are 16 permanent and 15 to 20 seasonal staff members who are responsible for the care and maintenance of park facilities, infrastructure, and physical and cultural resources. The maintenance staff performs a variety of duties ranging from lakeshore cleaning, swim beach preparation, and placement of floating restroom facilities on the lake to erosion control, hazard tree removal, and brushing of trailside vegetation. Besides these responsibilities, maintenance staff performs the daily functions of emptying trash receptacles, cleaning restrooms, inspecting and maintaining picnic areas and campgrounds, and maintaining water and wastewater systems throughout the park.

The roads and trails branch of the maintenance staff is responsible for the design, layout, maintenance, and interpretive signage of the park's trail system. It is perhaps important to note that no new trails have been constructed in Whiskeytown NRA for perhaps as much as 20 years. The current trail maintenance program is a cyclic-funded program with about $48,000 budgeted (2005) for trails and crew-related needs. Additional trail crew labor is supplied from June to August (8 week program) by the Youth Conservation Corps (YCC), comprised of one student leader and six youths between the ages of 15-18 years in age.

At this time, the maintenance staff is responsible for about 70 miles of existing trails within the park.

Law Enforcement and Fire Management

The Law Enforcement and Fire Management units for the park currently have 11 permanent staff members, 1 term staff member, and 8 seasonal staff members performing law enforcement, fire management, clerical, fuels crew and engine crew functions. The Fire Unit Module, a shared resource that assists in national wildland and prescribed fire management, has 5 permanent and 2 seasonal staff members.

Responsibilities of these staff members include search and rescue efforts, emergency medical assistance, assistance with traffic accidents, and fire management. Fire management staff also works with Maintenance staff in hazard tree removals, cleanup and repair from storm damage, and with the clearing of trails and roads of brush.

Visitor Use and Experience

Visitor experience is a term used to describe what a visitor senses physically, mentally, and emotionally in a park. A visitor's expectations, impressions, and memories of a park contribute to the overall park experience. How a visitor interacts with the resources, park staff, and other visitors are part of the visitor experience. What recreational opportunities are available and the quality of park programs, facilities, and services round out the park experience. Visitor safety within the park is critical to an enjoyable visit. The overall measure of visitor experience is visitor satisfaction.

While Whiskeytown National Recreation Area was originally focused on lake-based recreational opportunities, the public has expanded their interest and use of off-lake areas of the park. In response to the needs of the recreating public, the park seeks to accommodate those needs. Trail use and access to park lands is an appropriate visitor use and experience goal, consistent with the nationwide mission of the National Park Service.

When thinking about visitor use and experience goals for a trail system, a number of qualities, conditions, and perceptions can be identified.

1. Visual Resources/Vistas
Probably the best example of a visual resource at Whiskeytown National Recreation Area can be obtained from the parking lot at the Visitor Center at the junction of Highway 299 and Kennedy Memorial Drive. On a clear day, the view westward captures 6200 foot Shasta Bally as it looms over Whiskeytown Lake. Shasta Bally and nearby points, such as Kanaka Peak, South Fork Mountain and Buckhorn Bally, are sometimes cloaked in snow, adding to the scenic view. The lake is a stretch of blue water that extends from the steep hillside below the vantage point and continues along the south edge of Highway 299 as it travels westward. Other visual resources in the park can be experienced only from various vantage points alongside trails and roads that penetrate the less well-traveled areas of the park. Many of these vistas focus on the lake and views of mountains outside the park such as Mt. Shasta, Lassen Peak, and the Trinity Alps. These are some examples of how visual resources contribute to a positive visitor experience.

2. Well-maintained and Accessible Trails
Well-maintained trails with reasonable grades and dry, smooth surfaces represent the ideal. Different visitors seek or appreciate different experiences, often depending on whether they are walking, riding a bicycle, or atop a horse. The trails within Whiskeytown National Recreation Area typically traverse very steep and rugged areas and were not designed and built to Americans with Disabilities Act (ADA) standards. Due to the steep topography of the areas under consideration for new trail construction, it is not feasible to design the new trails under consideration within Whiskeytown National Recreation Area to meet ADA standards. The Whiskeytown Falls Trailhead parking area and approach to the kiosk will be constructed to ADA standards. In recent years, Whiskeytown National Recreation Area has installed two accessible fishing piers on Whiskeytown Lake at Oak Bottom and Whiskey Creek, and in 2004 installed a hardened path and platform leading from Brandy Creek Beach into Whiskeytown Lake to allow wheelchair confined visitors an opportunity to safely enjoy lake-based recreational activities.

3. Conflicts Among Users
Some conflicts among hikers, bicyclists, and equestrians are may occur on multi-use trails. Conflicts can be minimized by making multi-use trails wide enough to accommodate more than one user group. Multi-use trails that are signed to alert trail users of the possibility of encountering different users and to inform different user groups of trail etiquette not only promote safety but contribute to a positive trail experience. The park currently has not collected information on amount, duration, location, or season of trail use but will do so as part of the planned Backcountry Management Plan, as identified in the General Management Plan. The Backcountry Management Plan will identify where conflicts are occurring and how they can be mitigated.

4. Safety
Safety is critical to a positive visitor experience. Accurate directional and information signs, reasonable grades, dry surfaces, highway crossings with adequate sight distance to allow time to cross safely, and warning about natural hazards such as fallen trees, creek crossings, poisonous plants, and uneven surfaces, all increase visitor safety and can mean the difference between a pleasant visitor experience or one remembered negatively.

Approximately 700,000 visitors come to Whiskeytown National Recreation Area each year to enjoy the natural resources, participate in recreational and educational opportunities, and as a social experience. With the population of the City of Redding and surrounding Shasta County on the increase, more visitors, looking to enjoy the park's natural and cultural resources, can be expected. There is no data on the use of individual trails within the park. This includes what type of use, where the use occurs, when it occurs and how much there is. It is hoped that voluntary trail registers may enable the park to begin to acquire such data once this project is completed.

Increased interest in and use by members of the public of Whiskeytown National Recreation Area's trails have prompted park staff to begin planning for long range improvements. Some

equestrians and bikers use unmaintained or undesignated social trails in popular areas of the park. With the completion and improvement of the BLM trails network on the park's southeast boundary, the Mule Mountain Trail now provides a "gateway" for trail users to enter Whiskeytown National Recreation Area and to enjoy the well-developed trail system in the southeast section of the park.

Socioeconomic Considerations

Local and regional communities in the vicinity of the park provide visitor support and services that are not appropriate in the park itself, including fuel, lodging, food, and supplies. Redding, Shasta, and Weaverville are the closest communities with some or all of these services. The proposed project being examined in this environmental assessment seeks to connect park trails with those outside the park, allowing community residents and visitors staying in the communities or camping on adjacent public lands to access the park more easily and to create a sense of connection between the park and the local community. With the completion of Whiskeytown National Recreation Area's portion of the Shasta-Trinity Trail, a significant asset that neighboring communities can use to promote the area for tourism purposes will be created. As this trail gains national recognition, people from outside the region can be expected to come to hike, bike and ride the trail, bringing with them their needs for consumer services and benefiting the local economy.

ENVIRONMENTAL CONSEQUENCES / IMPACTS

Concept of impact analysis
The purpose of this section is to present to the reader an analysis of what impacts can be expected under each of the alternatives discussed in this document. Through presenting impacts analysis, the reader—and decision-makers—are better prepared to weigh advantages and disadvantages of the different alternatives.

For purposes of an analysis of the environmental consequences or impacts of each of the alternatives described in this Environmental Assessment, the Shasta-Trinity Trail alignment can be thought of as occurring in three segments or "sections" as they are hereafter called (see Figures 2, 3, and 4). Section 1 encompasses the Shasta-Trinity Trail alignment from its entrance into the park along Mule Mountain Pass Trail to connections with other trails in the below-dam, more well-developed portion of the park. Section 2 contains land adjacent to the largest expanse of Whiskeytown Lake and containing two shoreline campgrounds, yet with little back country access. It is in Section 2 that trail alignments pose the most serious challenges to the proposed project. Section 3 encompasses the northwestern section of the trail and leads from the Boulder Creek drainage to the ridgeline separating Crystal Creek from Mill Creek and finally into the Clear Creek drainage at the Tower House Historic District. The Historic District contains the largest assemblage of historic structures in the park and numerous existing roads and trails into the back country. Against this extremely varied background, the impacts of the proposed project's alternative means of implementation will be examined.

Each alternative is evaluated in terms of how the actions proposed will impact the affected environment described above. The reader is then able to evaluate the relative advantages and disadvantages of each alternative. A description of the methods for determining impacts to an affected environment is listed below, followed by an assessment of the environmental impacts for each alternative. Impacts are measured in terms of type, duration, and intensity.

Type of Impact
Adverse: *Likely to result in unnatural or detrimental changes to the resource.*
Beneficial: *Likely to protect, improve, and /or restore the resource.*
Duration of Impact
Short-term: *Immediate changes to the resource where the effects last one year (season).*

Intermediate-term*: Immediate changes to the resource where the effects last two to five years.*
Long-term: *Immediate changes to the resource where the effects last more than five years.*

Intensity of Impact

Negligible: *Imperceptible or undetectable impacts.*
Minor: *Slightly perceptible, and limited in extent. Without further impacts, adverse impacts would reverse and the resources would recover.*
Moderate: *Readily apparent, but limited in extent. Without further impacts, most adverse impacts would eventually reverse and the resource would recover. The impacts are localized in scale.*
Major: *Substantial, highly noticeable, and affecting a large area. Changes would not reverse without active management. The impacts are landscape-level in scale.*

Mitigation of impacts

Potential impacts to resources may be mitigated by one or more of the following:

- *Avoid* conducting management activities in an area of the affected environment.
- *Reduce* the type of impact to an affected environment.
- *Minimize* the duration or intensity of the impact to an affected environment.
- *Repair* localized damage to the affected environment immediately after an adverse impact.
- *Rehabilitate* an affected environment with a combination of additional management activities.
- *Compensation* of a major long-term adverse direct impact through additional strategies designed to improve an affected environment as much as is practical.

Impacts Common to All Alternatives

Regardless of which alternative is selected, the National Park Service expects increased use of trails, but with minimal added impacts to the existing trails. Since all three alternatives utilize existing trails, trail maintenance needs may increase slightly on both the existing and newly developed trails, but few additional resources will be needed.

Impairment Summary Statement

The National Park Service must consider the impacts of each alternative to determine if the described action would lead to an impairment of resources as discussed in the National Park Service Organic Act and the General Authorities Act. If there would be impairment the action may not be approved. An impairment is an impact that would harm the integrity of park resources or values (NPS Management Policies 2001). Not all impacts constitute impairment. Severity, duration, and timing of the impact help determine whether the integrity of a park resource or value would be irreparably compromised. No alternative discussed in this document has a specific goal that could result in impairment of a park resource. If there would be impairment the action will not be approved, and the selected alternative would be amended before preparing the decision document.

Physical Resources

Air Quality

Alternative A – No Action

Under this alternative, the Shasta-Trinity Trail would utilize existing trails and roads to route trail users through the park. Since no additional trail construction would be undertaken, no adverse impacts on climate or air quality from designating an alignment for the Shasta-Trinity Trail on existing trails and roads would ensue.

Alternative B - Limited Trail Development

There would be numerous, but short-term minor impacts to local air quality with this alternative. In places where the Shasta-Trinity Trail utilizes existing trails and roads, no adverse impacts would result. However, the Trail's alignment under this alternative requires additional trail construction and rerouting to be undertaken.

In Section 1, while the majority of the Trail would utilize existing trails and roads, a small section of trail (about 3000 feet) would need to be constructed to connect the Knobcone Trail at NEED camp bridge with Martha's Ditch Trail and a short segment (600 feet) would be constructed adjacent to Mule Town Road near the Salt Creek/Buck Hollow Trailhead. This new construction would require the use of chain saws for tree felling and brush removal, manual removal of downed log segments, and manual digging to clear an area for the trail and to establish its base. Some use of rock hammers and/or blasting may be required to construct this section of the trail through areas where the ground surface is bedrock. The alignment for the re-routed trail segments would be cleared with hand tools and chain saws. While these activities would produce dust from hauling and trail construction, exhaust fumes from mechanized equipment, and dust and fumes from blasting the impacts, while adverse, would be short-term and minor in intensity.

In Section 2, air quality impacts from this alternative would be the greatest since approximately 4 miles of new trail would need to be constructed, virtually the entire length of trail through this section. This new construction would require the use of chain saws for brush removal, manual removal of downed log segments, and manual digging to clear an area for the trail tread. Some use of rock hammers and/or blasting may be required to construct the trail through areas where the ground surface is bedrock. While these activities would produce dust and fumes from mechanized equipment and blasting, the impacts, while adverse, would be short-term and minor in intensity.

There would be minimal impacts to air quality in Section 3 as this alternative's proposed alignment would utilize a ridge top fuelbreak and the existing trails before crossing under the bridge at Highway 299. There would only be a small amount of vegetation that would need to be removed from this section since the fuelbreak has already been cleared of most vegetation. Impacts to air quality in this section will be negligible.

Alternative C – Expanded Trails System Development – Proposed Action

Impacts resulting from the implementation of this alternative would be similar to those in Alternative B; however, there would be several additional spur trails constructed under this alternative, including the construction of about 2 ½ miles of new trails in Section 3 (see Figure 4). The impacts from creating these two new trail spurs would be similar to those already described for other new trail segments. This alternative's Section 3 contains more new or reconfigured trail segments than Alternative B but, as these would not be constructed simultaneously, air quality impacts could be kept at a minimum by phasing work in this section.

Cululative impacts to air quality under Alternative A will be nonexistent. Cumulative impacts to air quality under Alternatives B and C will be adverse, short-term, and minor in intensity. Major projects impacting air quality within the project area are mostly related to prescribed fire projects or pile burning from hazard fuel reduction projects. The cumulative impacts to air quality from the Shasta-Trinity Trail Project are minimal.

Geologic Resources

The potential adverse impact to geologic resources is limited to increased erosion of bedrock in areas where new trail construction and trail rerouting occur and where construction occurs beneath the soil profile or where no soil profile exists or where steps and handrails are constructed into the bedrock. Proper trail construction practices such as outsloping, rock wall, foot bridges, rolling dips, and other erosion control features as mitigation will reduce the intensity of the impacts. In the areas of trail reroutes, there is a beneficial impact of overall reduced erosion. This can be attributed to new trail design standards being implemented and rehabilitation of old, poorly designed trails.

Alternative A – No Action

Under this alternative, in all three sections, impacts to geologic resources will continue approximately at current rates. Impacts to geologic resources are limited to bedrock erosion due to trail and road maintenance. The greatest impact is grading of the roads while trail maintenance is considered to have low impacts. Generally, impacts to geologic resources under this alternative are adverse and long-term in duration, and moderate in intensity for roads and minor intensity for trails.

Alternative B - Limited Trail Development

In Section 1, proposed actions include use of existing roads and trails, rerouting of existing trails, installation of a foot bridge, and construction of new trails. Impacts to geologic resources on existing roads and trails are similar to Alternative A. In areas where trails are rerouted, impacts to geologic resources include increased bedrock erosion if construction occurs beneath the soil profile. The impacts to geologic resources are considered to be adverse, long-term, and minor in intensity. The trail reroutes are intended to reduce the overall grade of the trails and installation will include erosion control measures, such as outsloping, which do not exist on the existing trails. Additionally, the abandoned section will be rehabilitated to natural conditions. These design features will reduce overall erosion of the trail and impacts are considered to have a beneficial, long-term, and minor in intensity. In areas of new trail construction, impacts to geologic resources include increased erosion of bedrock if construction occurs beneath the soil profile. The impacts to geologic resources are considered to be adverse, long-term, and minor in intensity. A footbridge will be installed along the Peltier Trail where it crosses Paige-Boulder Creek and will be break-away planks anchored by cable to natural features like tree trunks or nearby boulders. This light impact design is consistent with most bridges in the backcountry area of Whiskeytown located in the upper drainages where periodic debris flows and high frequency flooding occurs. Impacts to geologic resources from installation of this foot bridge are considered negligible. Installation of steps into bedrock with use of a rock hammer is considered to be adverse, long-term, and minor in intensity.

In Section 2, proposed actions include use of existing roads and trails and construction of new trails. Impacts to geologic resources on existing roads and trails are the similar to Alternative A. In areas of new trail construction, impacts to geologic resources include increased erosion of bedrock if construction occurs beneath the soil profile. The impacts to geologic resources are considered to be adverse, long-term, and minor in intensity.

In Section 3, proposed actions include use of existing roads and trails and construction of new trails. Impacts to geologic resources on existing roads and trails are the similar to Alternative A. In areas of new trail construction, impacts to geologic resources include increased erosion of

bedrock if construction occurs beneath the soil profile. The impacts to geologic resources are considered to be adverse, long-term, and minor in intensity.

Alternative C – Expanded Trails System Development – Proposed Action

This alternative is the same as Alternative B with expanded trail construction including a spur trail constructed to follow an unnamed tributary between Liberty Gulch and Red gulch east of the Whiskey Creek arm of the lake, the Whiskeytown Falls trail, and a trail connecting the Crystal Creek Water Ditch Trail to the Camden Water Ditch Trail. Since all activities are similar to Alternative B, the impacts to geologic resources are considered the same as Alternative B, except for the Whiskeytown Falls area in Section 3.

In Section 3, The Whiskeytown Falls Trail will use existing roads and new trail construction, installation of a foot bridge, and a hand rail constructed on the Whiskeytown Falls trail. This is the only proposed trail that is constructed in the Shasta Bally Batholith granodiorite, an extremely erosive substrate with little soil development. Once disturbed, erosion processes continue at accelerated rates with little ability for mitigation. Trail installation will include erosion control measures, such as outsloping, but these techniques will be minimally successful, particularly on slopes over 30 percent in grade. Impacts to geologic resource from the existing road and trail network and new trail construction are considered adverse, long-tem, and moderate. Installation of the hand rail will require drilling into the bedrock and is considered to be adverse, long-term, and minor in intensity. In conjunction with the hand rail, steps will likely need to be carved into the bedrock to facilitate safe access for visitors. Installation of the steps will require use or a rockhammer and impacts are considered to be adverse, long-term and minor in intensity. A footbridge will be installed where it crosses Crystal Creek and will be break-away planks anchored by cable to natural features like tree trunks or nearby boulders. This light impact design is consistent with most bridges in the backcountry area of Whiskeytown located in the upper drainages where periodic debris flows and high frequency flooding occurs. Impacts to geologic resources from installation of this foot bridge are considered negligible.

Cumulative impacts to geologic resources under Alternatives A, B, and C in all three Sections will include impacts from increased erosion where trail construction occurs beneath the soil profile. Included in these cumulative impacts are recent trail building actives in Section 1 along the Mt. Shasta Mine Loop Trail and Mule Mountain. More impacts can be expected under Alternative B than Alternative A, and more under Alternative C than Alternatives A and B, due to increases in trail building. Cumulative impacts to geologic resources for Alternative A will be negligible because there is no additional trail or road construction. Cumulative impacts to geologic resources for Alternative B and C will be adverse, long-term, and minor because the new and rerouted trails will use erosion control techniques not use on other existing roads and trails and recent trail construction includes these erosion control features.

Soils

The potential adverse impact to soil is limited to increased erosion of soil in areas where new trail construction and trail rerouting occur and where construction occurs. Proper trail construction practices such as outsloping, rock walls, rolling dips, foot bridges, and other erosion control features as mitigation will reduce the intensity of the impacts. Where the trail crosses streams there is increased erosion of the stream banks, particularly from bikes and horses. In the areas of trail reroutes, there is a beneficial impact to soils by an overall reduction in erosion because old, poorly constructed trails will be replaced by lower grade trails with proper erosion BMP's.

Alternative A – No Action

Under this alternative, in all three sections, impacts to soil will continue approximately at current rates. Impacts to soil are erosion due to trail and road maintenance and visitor use. The greatest impact is grading of the roads while trail maintenance and visitor use is considered to have low impacts. Generally, impacts to soil under this alternative are adverse, long-term in duration, and moderate in intensity for roads and minor intensity for trails. Where trails cross perennial or

intermittent streams localized impacts to soil are considered adverse, long-term, and moderate in intensity.

Alternative B - Limited Trail Development

In Section 1, proposed actions include use of existing roads and trails, rerouting of existing trails, and construction of new trails. Impacts to soil on existing roads and trails are similar to Alternative A. In areas where trails are rerouted, impacts to soil include increased erosion from trail construction. These impacts to soil are considered to be adverse, long-term, and minor in intensity. The trail reroutes are intended to reduce the overall grade of the trails and installation will include erosion control measures, such as outsloping, which do not exist on the existing trails. Additionally, the abandoned section will be rehabilitated to natural conditions. These design features will reduce overall erosion of the trail and impacts are considered to have a beneficial, long-term, and minor in intensity. In areas of new trail construction, impacts to soil include increased erosion. The impacts to soil are considered to be adverse, long-term, and minor in intensity. Where trails cross perennial or intermittent streams localized impacts to soil are considered adverse, long-term, and moderate in intensity. A footbridge will be installed along the Peltier Trail where it crosses Paige-Boulder Creek and will be break-away planks anchored by cable to natural features like tree trunks or nearby boulders. This light impact design is consistent with most bridges in the backcountry area of Whiskeytown located in the upper drainages where periodic debris flows and high frequency flooding occurs. Impacts to soils from installation of this foot bridge are considered negligible.

In Section 2, proposed actions include use of existing roads and trails and construction of new trails. Impacts to soil on existing roads and trails are the similar to Alternative A. In areas of new trail construction, impacts to soil include increased erosion. The impacts to soil are considered to be adverse, long-term, and minor in intensity. Where trails cross perennial or intermittent streams localized impacts are considered adverse, long-term, and moderate in intensity.

In Section 3, proposed actions include use of existing roads and trails and construction of new trails. Impacts to soil on existing roads and trails are similar to Alternative A. In areas of new trail construction, impacts to soil include increased erosion. The impacts to soil are considered to be adverse, long-term, and minor in intensity. Where trails cross perennial or intermittent streams localized impacts are considered adverse, long-term, and moderate in intensity

Alternative C – Expanded Trails System Development – Proposed Action
This alternative is the same as Alternative B with expanded trail construction including a spur trail constructed to follow an unnamed tributary between Liberty Gulch and Red gulch east of the Whiskey Creek arm of the lake, the Whiskeytown Falls trail, and a trail connecting the Crystal Creek Water Ditch Trail to the Camden Water Ditch Trail. Since all activities are similar to Alternative B, the impacts to soil are considered the same as Alternative B except for the Whiskeytown Falls area in Section 3.

In Section 3, the Whiskeytown Falls Trail will use existing roads and new trail construction and installation of a foot bridge. This is the only proposed trail that is constructed in the Shasta Bally Batholith granodiorite, an extremely erosive substrate with minimal soil development. Once disturbed, erosion processes continue at accelerated rates with little ability for mitigation. Trail installation will include erosion control measures, such as outsloping, construction of rock walls, retaining walls, and water bars to minimize impacts to soil from the existing road and trail network and new trail construction. Impacts are considered adverse, long-tem, and minor. A footbridge will be installed where it crosses Crystal Creek and will be break-away planks anchored by cable to natural features like tree trunks or nearby boulders. This light impact design is consistent with most bridges in the backcountry area of Whiskeytown located in the upper drainages where periodic debris flows and high frequency flooding occurs. Impacts to soils from installation of this foot bridge are considered negligible.

Cumulative impacts to soil under Alternatives A, B, and C in all three Sections will include impacts from increased erosion where trail construction occurs. Included in these cumulative impacts are

recent trail building actives in Section 1 along the Mt. Shasta Mine Loop Trail and Mule Mountain More impacts can be expected under Alternative B than Alternative A, and more under Alternative C than Alternatives A and B, due to increases in trail building. Cumulative impacts to soil for Alternative A will be negligible because there is no additional trail or road construction. Cumulative impacts to soil for Alternative B and C will be adverse, long-term, and minor because the new and rerouted trails will use erosion control techniques not use on other existing roads and trails and recent trail construction includes these erosion control features.

Water Quality

The actions of trail rerouting and new trail construction have potential adverse effect to water quality in the form of increased sedimentation to streams. Proper trail construction practices such as outsloping, rock walls, rolling dips, and other erosion control features used as mitigation will reduce the intensity of the impacts. Where the trail crosses streams there will be increased erosion of the stream banks, particularly from use by bikes and horses, directly increasing sediment delivery to streams.

The presence of humans in remote areas without sanitation facilities has the potential to adversely affect water quality in the form of waterborne pathogens such as *E. Coli* and other indicators of fecal contamination from human waste. Additionally, areas that have prolonged use, such as camping, have the potential to concentrate human waste. To reduce the intensity of these impacts, camping restrictions and public education will be utilized. Signs will be posted at trail heads instructing visitors how to “Leave No Trace” including proper disposal of human waste. This information will also be made available at our Visitor Center. Other developed areas have adequate restroom facilities and human waste disposal is considered to have no impact.

Alternative A – No Action

Under Alternative A, no trail rerouting or new trail construction will occur in all Sections and the amount of sedimentation to streams will continue at the present rate. The ongoing sediment delivery will continue and the impacts to water quality will be adverse, long-term, and moderate in intensity for existing roads and minor in intensity for existing trails. Where trails cross perennial or intermittent streams localized impacts to water quality are considered adverse, long-term, and moderate in intensity.

Disposal of human waste will continue in its present fashion in all sections. There is no biological data on fecal indicators for streams and little visible evidence along the trails that impacts are occurring. With this in mind the impact to water quality from human waste is considered to be adverse, long-term, and minor in intensity.

Alternative B - Limited Trail Development

In Section 1, proposed actions include use of existing roads and trails, rerouting of existing trails, and construction of new trails. Impacts to water quality on existing roads and trails are similar to Alternative A. In areas where trails are rerouted, impacts to water quality include increased sediment delivery to streams. These impacts to water quality are considered to be adverse, long-term, and minor in intensity. The trail reroutes are intended to reduce the overall grade of the trails and installation will include erosion control measures, such as outsloping, which do not exist on the existing trails. Additionally, the abandoned section will be rehabilitated to natural conditions. These design features will reduce overall sediment delivery to streams and the impacts to water quality are considered to be beneficial, long-term, and minor in intensity. In areas of new trail construction, impacts to water quality include increased sediment delivery. The impacts to water quality are considered to be adverse, long-term, and minor in intensity. Where trails cross perennial or intermittent streams, localized impacts to water quality are considered adverse, long-term, and moderate in intensity.

In Section 1, there are potential impacts to water quality from disposal of human waste. Section 1 includes a remote section of trail extending from NEED Camp to Sheep Camp on the boundary of

Section 2. One area in the NW portion of Section 2 of the trail, PLSS (Public Lands Survey System) section 3 along the ridge saddle has good views and is potentially an area of concentrated visitor use in the form of back country camping. With the potential concentration of camping comes the potential concentration of human waste. Perennial and intermittent streams are at least a quarter-mile away and this will reduce the potential impacts to water quality. To reduce the impacts of human waste disposal, public information signs will be posted at all designated access points leading into the remote area. The impacts to water quality are considered to be adverse, long-term, and minor in intensity in all remote areas of this Section, except in the NW portion of Section 2 of the trail, PLSS section 3, along the ridge saddle where impacts to water quality are considered adverse, long-term, and moderate in intensity.

In Section 2, proposed actions include use of existing roads and trails and construction of new trails. Impacts to water quality on existing roads and trails are the similar to Alternative A. In areas of new trail construction, impacts to water quality include increased sediment delivery to streams. The impacts to water quality are considered to be adverse, long-term, and minor in intensity. Where trails cross perennial or intermittent streams localized impacts to water quality are considered adverse, long-term, and moderate in intensity.

In Section 2, there are potential impacts to water quality from disposal of human waste. Section 2 includes a remote section of trail extending from Sheep Camp to the intersection of the Boulder Creek Trail near the boundary of Section 3. This area has never been developed for visitor use and remains ‘pristine’ except for some old logging roads from the 1960’s and early 1970’s in the Papoose Gulch area. Additionally, the ridgeline the trail follows in PLSS section 24 above the 2800 feet contour has spectacular views of Whiskeytown Lake and Shasta Bally and is potentially an area of concentrated visitor use in the form of back country camping. With the potential concentration of camping comes the potential concentration of human waste. Perennial and intermittent streams are at least a quarter-mile away and this will reduce the potential impacts to water quality. Another remote area extends from South Shore Drive along the Boulder Creek Trail to the boundary of Section 3. To reduce the impacts of human waste disposal, public information signs will be posted at all designated access points leading into the remote area. The impacts to water quality are considered to be adverse, long-term, and minor in intensity in all remote areas of this Section, except for the ridgeline along PLSS section 24 above the 2800 feet contour where impacts to water quality are considered adverse, long-term, and moderate in intensity.

In Section 3, proposed actions include use of existing roads and trails and construction of new trails. Impacts to water quality on existing roads and trails are similar to Alternative A. In areas of new trail construction, impacts to water quality include increased sediment delivery to streams. The impacts to water quality are considered to be adverse, long-term, and minor in intensity. Where trails cross perennial or intermittent streams localized impacts to water quality are considered adverse, long-term, and moderate in intensity.

In Section 3, there are potential impacts to water quality from disposal of human waste. Section 3 includes a remote section of trail extending from the eastern boundary of Section 3 to the Camden House Historic District. Boulder Creek Falls is an area of concentrated visitor use in the form of back country camping. With the potential concentration of camping comes the potential concentration of human waste. Disposal and concentration of human waste will occur within 100’ of the perennial stream of Boulder Creek without mitigation. To reduce the impacts of human waste disposal, public information signs will be posted at all designated access points leading into the remote area and camping will not be allowed within 100’ of the stream. Impacts to water in the area around the Whiskeytown Falls Trail will be minimized by use of erosion control techniques such as retaining walls, water bars, and other accepted erosion control Best Management Practices (BMP’s). The impacts to water quality are considered to be adverse, long-term, and moderate in intensity.

Alternative C – Expanded Trails System Development – Proposed Action

This alternative is the same as Alternative B with expanded trail construction including a spur trail constructed to follow an unnamed tributary between Liberty Gulch and Red Gulch east of the Whiskey Creek arm of the lake, the Whiskeytown Falls Trail, and a trail connecting the Crystal Creek Water Ditch Trail to the Camden Water Ditch Trail. Since all activities are similar to Alternative B, the impacts to water quality are considered the same as Alternative B except for the Whiskeytown Falls area in Section 3.

In Section 3, the Whiskeytown Falls Trail will use existing roads and new trail construction. This is the only proposed trail that is constructed in the Shasta Bally Batholith granodiorite, an extremely erosive substrate. Once disturbed, erosion processes continue at accelerated rates without proper mitigation. Trail installation will include erosion control measures, such as outsloping and installation of rock walls on slopes 30 percent in grade or greater. Additionally, existing roads will have the inboard ditches removed, the road prism outsloped, and rolling dips and lower water crossings will be installed at hydrologic crossings. Impacts to water quality from the existing road and trail network and new trail construction are considered adverse, long-tem, and moderate given these mitigations.

In Section 3, Whiskeytown Falls is intended be an area of concentrated visitor use and will attract back country camping. With the potential concentration of camping comes the potential concentration of human waste. Disposal and concentration of human waste will occur within 100' of the perennial stream of Crystal Creek without mitigation. To reduce the impacts of human waste disposal, public information signs will be posted at all designated access points leading into the remote area and only day use of the area will be allowed. Impacts to water quality in the Whiskeytown Falls area are considered adverse, long-term, and minor in intensity.

Cumulative impacts to water quality from increase sedimentation under Alternatives A, B, and C in all three Sections will include impacts from increased erosion where trail construction occurs beneath the soil profile. More impacts can be expected under Alternative B than Alternative A, and more under Alternative C than Alternatives A and B, due to increases in trail building. Cumulative impacts to water quality for Alternative A will be negligible because there is no additional trail or road construction. Cumulative impacts to water quality for Alternative B and C will be adverse, long-term, and minor because the new and rerouted trails will use erosion control techniques not use on other existing roads and trails.

Cumulative impacts to water quality from human waste under Alternatives A, B, and C in all three Sections will include impacts from increased visitor use. More impacts can be expected under Alternative B than Alternative A, and more under Alternative C than Alternatives A and B, due to increases in trail building. Cumulative impacts to water quality for Alternative A will be negligible because there is no additional trail or road construction. Cumulative impacts to water quality from human waste for Alternative B and C will be adverse, long-term, and minor.

Wetlands/Floodplains

Under all Alternatives and in all Sections there is no effect to wetlands and floodplains. Currently, all existing roads and trails, trail reroutes, and new trail construction considered under this plan are not designed or exist in wetlands or floodplains as defined in Executive orders 11988 – Flood Plain Management and 11990 – Protection of Wetlands.

Biological Resources

Vegetation and Plant Communities

Potential impacts to the vegetation and plant communities of the park resulting from the alignment of the Shasta-Trinity Trail include the following:

- Removal of Vegetation
- Impacts to Rare/Sensitive Plants
- Plant Health
- Non-Native Species Introduction and Spread
- Erosion

Alternative A – No Action

Under this alternative, impacts to vegetation and plant communities will continue approximately at current rates. Current impacts to vegetation include some removal of vegetation during routine trail maintenance, minor impacts from visitor use such as trampling, soil compaction, and erosion, and minor impacts related to introduction of non-native species. Generally, impacts to vegetation and plant communities under this alternative are adverse and long-term in duration, but minor in intensity in all sections.

Alternative B – Minimum Trail Development

Under this alternative, impacts to vegetation in Section 1 will be similar to Alternative A with the exception of the new trail segment that will be constructed adjacent to Mule Town Road near the Buck Hollow/Salt Creek Trailhead and the new segment connecting the Knobcone Trail to Martha's Ditch Trail. These two segments will total approximately 1000 meters (.6 miles) of new trail. Vegetation communities that would be impacted in this section include chaparral, knobcone pine, and mixed oak communities. Direct impacts will result from removal of vegetation with chainsaws and hand tools. The trail will be routed around large trees to minimize impacts and limbs that need to be removed from large trees will be cut at the limb collar whenever possible to promote healing and reduce the long-term impacts to the trees. Impacts to vegetation will be adverse, long-term and moderate in intensity due to the limited extent of the vegetation that would need to be removed to establish the trail tread and corridor.

Construction of the trail within Section 2 will require approximately 4 miles of new trail to be constructed. Vegetation communities that will be impacted in this section include mixed oak, ponderosa pine, and chaparral communities. The chaparral communities dominate the southern half of this section while the ponderosa pine and mixed oak communities are more prevalent on the northern half of this section. Impacts to vegetation will be similar to Section 1, although greater in scale due to the length of trail that will need to be constructed. The northern half of this trail section has sparse understory vegetation and will require much less vegetation removal than the areas dominated by chaparral. Mitigation measures will be similar as in Section 1 in that the trail will be routed around large trees and trimming will be done in a manner that minimizes long-term impacts. Impacts will be adverse, long-term in duration, and moderate in intensity.

Impacts to vegetation within Section 3, under Alternative B, will be very similar to those within Alternative A. The only section of new trail that will be constructed will occur on a current fuelbreak where little vegetation removal or trimming will be necessary. Again, the trail will be routed to avoid large trees and necessary trimming will be done in a manner that minimizes long-term impacts to the tree. The plant communities that will be impacted within Section 3 include ponderosa pine, mixed conifer, mixed oak, and chaparral. The majority of the new trail construction will occur within the chaparral and mixed oak communities. Impacts to vegetation within this section will be adverse, long-term in duration and minor in intensity.

Alternative C – Expanded Trails System Development – Proposed Action

Impacts to vegetation communites within Sections 1 and 2 will be identical to Alternative B.

Impacts to vegetation communities within Section 3 will be similar to Alternative B with the exception of the additional recreational trails that will be constructed to allow visitors to access Whiskeytown Falls (1.5 miles) and the trail that will be constructed to connect the Crystal Creek Water Ditch Trail to the Camden Water Ditch Trail (0.8 miles). An additional spur trail (approximately 0.5 miles) will be constructed up an unnamed gulch between Liberty Gulch and Red Gulch. Trails will be routed to avoid large trees and correct trimming of trees will be utilized to minimize long-term impacts. Impacts to vegetation along these additional trails will be similar to those that will occur where other new trails are constructed. Vegetation communities that will be impacted include ponderosa pine, mixed conifer, mixed oak, and chaparral. Impacts to vegetation within Section 3 under Alternative C will be greater than Alternative B and will be adverse, long-term, and moderate in intensity.

Cumulative impacts to vegetation and plant communities under Alternatives A, B, and C in all three Sections will include impacts from recreational use such as trampling, collecting, soil compaction, litter and waste depositions, the potential spread of plant pathogens and exotic plants, and wildland or prescribed fire impacts. More impacts can be expected under Alternative B than Alternative A, and more under Alternative C than Alternatives A and B, due to increases in the amount of land affected and increases in the degree of recreational use. Cumulative impacts to vegetation and plant communities is likely to be adverse, long-term, and minor to moderate, although the degree of potential impacts is impossible to assess accurately.

Sensitive Plant Species

There are no known state or federally-listed threatened or endangered plants in the park, although blue elderberry is host to the federally-listed threatened valley elderberry longhorn beetle, and the elderberry must be protected as if it were listed. The only known population within the park occurs along Trinity Mountain Road near the park boundary and is not within the proposed route of the Shasta-Trinity Trail under any of the alternatives. Plant species of special concern (threatened, endangered, candidate, or sensitive species) found in the park include: Howell's alkali grass (*Puccinellia howellii*), Shasta County arnica (*Arnica venosa*), clustered lady's slipper (*Cypripedium fasciculatum*), western trillium (*Trillium ovatum*), Sanborn's onion (*Allium sanbornii ssp. sanbornii*), snow mountain beard tongue (*Penstemon purpusii*), Tehama navarretia (*Navarretia heterandra*), yellow triteleia (*Triteleia crocea Greene var crocea*), Sanford's arrowhead (*Sagittaria sanfordii*), small spikerush (*Eleocharis parvula*), three-bracted onion (*Allium tribracteatum*), Mildred's clarkia (*Clarkia mildrediae*), Sierra clarkia (Clarkia virgata), Rattan's linanthus (*Linanthus rattanii*), red-anthered juncus (*Juncus marginatus*), and canyon stonecrop (*Sedum paradisum*). None of these species of special concern are known to occur in the proposed Shasta-Trinity Trail project area.

Alternative A – No Action

Under Alternative A, impacts to sensitive plant species will be negligible within all sections.

Alternative B – Minimum Trail Development

Sensitive plants that have suitable habitat within Section 1 include Sanborn’s onion, three-bracted onion, Shasta County arnica, Mildred’s Clarkia, small spikerush, Sierra Clarkia, Sanford’s arrowhead, blue elderberry, canyon stonecrop, and Tehama navarretia. Potential impacts resulting from new trail construction and trail reroutes within this section will be minimized by completing surveys for sensitive plants prior to trail construction and routing the trail around sensitive plants or populations of sensitive plants that are discovered. Workers will also be instructed to look for these plants and work will be stopped and mitigation measures implemented to protect these or other plants of special concern discovered during project work. Nonetheless, some negative impacts to sensitive plants may occur as a result of new trail construction,

however, these impacts are likely to me minor and short-term. If surveyed and avoided, impacts to most of the sensitive plant populations will be long-term and minor. Some beneficial impacts may occur for Shasta County Arnica as a result of trail construction as it is known to colonize areas that have been disturbed, particularly on north facing aspects. These beneficial impacts will likely be negligible and long-term.

Sensitive plants that have suitable habitat within Section 2 include Sanborn's onion, Shasta County Arnica, Sierra Clarkia, and canyon stonecrop. The portions of the proposed new trail within this section have not been surveyed for these species. Potential impacts resulting from new trail construction and trail reroutes within this section will be minimized by completing surveys for sensitive plants prior to trail construction and routing the trail to avoid individual plants or populations of sensitive plants that are discovered. Workers will also be instructed to look for these plants and work will be stopped and mitigation measures implemented to protect these or other plants of special concern discovered during project work. Nonetheless, some negative impacts to sensitive plants may occur as a result of new trail construction, however, these impacts are likely to be minor and short-term. If large numbers or entire populations are inadvertently destroyed during trail construction impacts would be moderate to major.

Sensitive plants that have suitable habitat within Section 3 include Sanborn's onion, three-bracted onion, Shasta County arnica, Mildred's Clarkia, Sierra Clarkia, small spikerush, Sanford's arrowhead, blue elderberry, canyon stonecrop, and Tehama navarretia. A higher number of sensitive plant species that may be encountered in Section 3 due to broader elevation variance. Surveys are not complete in these areas and will be completed prior to trail construction. Impacts to sensitive species will be minimized by routing the trail to avoid individual plants or populations of sensitive plants that are discovered. Workers will also be instructed to look for these plants and work will be stopped and mitigation measures implemented to protect these or other plants of special concern discovered during project work. Nonetheless, some negative impacts to sensitive plants may occur as a result of new trail construction; however, these impacts are likely to be minor and short-term. Some beneficial impacts may occur for Shasta County Arnica as a result of trail construction as it is known to colonize areas that have been disturbed, particularly on north facing aspects. These beneficial impacts will likely by negligible to minor.

Alternative C – Expanded Trail System Development – Proposed Action

Under Alternative C, impacts to sensitive plant species will be negligible within all sections.

Under Alternative C, impacts to sensitive plant species within Sections 2 and 3 will be similar as in Alternative B with the exception that the scope of the impacts will be slightly greater due to the additional 3 miles of new trail that would be created. Impacts to Howell's alkali grass from the new trail connecting the Crystal Creek Water Ditch Trail to the Camden Water Ditch Trail will be avoided by routing the trail away from current populations or areas where suitable habitat may be present. This plant has very specific habitat needs and the proposed trail is located approximately 500 feet south of any suitable habitat.

Cumulative impacts to sensitive plants and their habitat under Alternatives A, B, and C in all three Sections will include impacts from recreational use such as trampling, collecting, soil compaction, litter and waste depositions, the potential spread of plant pathogens and exotic plants, and wildland or prescribed fire impacts. More impacts can be expected under Alternative B than Alternative A, and more under Alternative C than Alternatives A and B, due to increases in the amount of land affected and increases in the degree of recreational use. Cumulative impacts to sensitive plants and their habitats likely to be adverse, long-term, and minor to moderate, although the degree of potential impacts is impossible to assess accurately.

Invasive Plant Species

Numerous exotic or alien plant species have become established in some areas of the park and exotics currently account for approximately 25-30 percent of the plants in the park. Many exotic plants are highly invasive, able to out-compete native species, and disrupt native plant

communities and processes. An accurate and complete assessment of the abundance and extent of exotics in the park was completed in 2003. Several infestations have been successfully treated and control efforts for the next several years are expected to achieve a significant reduction in exotic plant populations in the park. Treated areas will require monitoring and re-treating indefinitely. The park works cooperatively with the Shasta County Weed Management Area to eradicate exotics across boundaries. Of greatest concern is that the proposed trail system will act as a conduit of invasion of many of the described non-native and invasive plant species.

Alternative A – No Action

Under this Alternative, the spread, density patterns, and level of new introductions of invasive plant species will remain consistent with current levels.

Alternative B – Minimum Trail Development

Invasive plant species known to occur in Section 1 and that have the potential to spread densely or rapidly include tree-of-heaven, wild oat, giant reed, foxtail chess, cheatgrass, yellow starthistle, bull thistle, scotch broom, sweet fennel, mustard species, French broom, Himalayan blackberry, Spanish broom, moth mullein, and vetch species. New trail construction will provide disturbed areas that many invasive plant species may colonize. Many of the above species are oftentimes transported by visitors, either in mud on shoe soles, in bicycle tire tread, or by horses and it is unlikely that this impact can be avoided. To minimize impacts associated with invasive exotics, the trails will need to be monitored and new infestations of invasive exotics treated as they occur. The areas in Section 1 are generally highly impacted from past resource extraction activities and many of the areas have already been colonized by many exotic plant species. Additionally, the amount of new trail proposed to be constructed within this section is fairly low (approximately 3600 feet) and much of it is near existing roads where areas have already been impacted. Impacts pertaining to invasive plant species relative to Section 1 under this alternative are adverse and long-term. The intensity of the impact is minor due to the limited extent of disturbed area.

Current levels of invasive plant infestation within Section 2 is unknown at this time, however it is likely that the level of infestation is currently fairly low due to the minor degree of past disturbances and human activity in this area. Several invasive plant species potentially could be introduced to this area as new trail construction will provide disturbed areas that many invasive plant species colonize. These species will likely be transported by visitors, either in mud on shoe soles, in bicycle tire tread, or by horses and it is unlikely that this impact can be avoided. To minimize impacts associated with invasive exotics in this section, the trail will need to be monitored and new infestations of invasive exotic plants will need to be treated as they occur. Environmental impacts to this area will likely be adverse, long term and moderate in intensity due to the probability of introducing invasive exotic plants to an area that historically has not been impacted by humans.

Invasive plant species known to occur in Section 3 that have potential to spread densely or rapidly include tree-of-heaven, giant reed, foxtail chess, cheatgrass, yellow starthistle, bull thistle, scotch broom, sweet fennel, mustard species, French broom, Himalayan blackberry, Spanish broom, moth mullein, and vetch species. Many of these species will likely colonize newly disturbed areas within this section, particularly where new trails are constructed. These species will likely be transported by visitors, either in mud on shoe soles, in bicycle tire tread, or by horses and it is unlikely that this impact can be avoided. To minimize impacts associated with invasive exotics in this section, the trail will need to be monitored and new infestations of invasive exotic plants will need to be treated as they occur. Environmental impacts to this area will likely be adverse, long term and minor in intensity due to the probability of introducing invasive exotic plants to an area that historically has not been heavily impacted by visitors or other uses.

Alternative C – Expanded Trail System Development – Proposed Action

Impacts from invasive plant species in all Sections will be similar to those under Alternative B but more widespread due to the additional 3 miles of new trails that will be constructed. The impacts are somewhat exacerbated due to the fact that the areas where additional trails are planned are impacted from historic human use and many of the areas have already been colonized by invasive plant species. The repeated ground disturbance from traffic and trail maintenance has the potential to amplify the degree of infestation, introduce new non-native and invasive species and spread to uninfested areas. The Whiskeytown Falls Trail follows an abandoned logging road for the majority of its length and the trail connecting the Crystal Creek Water Ditch Trail to the Camden Water Ditch Trail is located in an area that was heavily impacted from past mining-related activities. The proposed trail between Liberty Gulch and Red Gulch is also in an area that is heavily impacted from past use. Impacts from invasive plant species under Alternative C will be adverse, long-term, and moderate in intensity.

Cumulative impacts to native plants and their habitat from invasive exotic plants under Alternatives A, B, and C in all three Sections will include impacts from recreational use such as trampling, collecting, soil compaction, litter and waste depositions, the potential spread of plant pathogens and increased species and numbers of exotic plants transported by pedestrians, horses, equipment, and bicycles and wildland or prescribed fire impacts. More impacts can be expected under Alternative B than Alternative A, and more under Alternative C than Alternatives A and B, due to increases in the amount of land affected and increases in the degree of recreational use. Cumulative impacts are likely to be adverse, long-term, and minor to moderate, although the degree of potential impacts is impossible to assess accurately.

Ecologically Critical Areas
The following four areas are considered to be ecologically sensitive since they embody unique and special resource values found in the park. Three of these areas could be affected by the actions described in this Environmental Assessment.

Mineral Springs
The only trail that could potentially have an impact on the mineral springs within the park is the proposed new trail (under Alternative C) that would connect the Crystal Creek Water Ditch Trail to the Camden Water Ditch Trail. This trail was aligned specifically to avoid impacting this important area. To avoid impacts, the potential trail will be located a minimum of 500 feet to the south of any of the springs or known populations of Howell's alkali grass, which is dependent on the springs. There will be no impacts to the mineral springs under any of the proposed alternatives.

Old Growth
There will be no impacts to old growth forests under Alternative A. Alternative B and C will have minimal impacts as some sections of the new trails are routed through areas that were never logged, or were only selectively logged on a small-scale basis. The impacts from trail construction will be minimized by locating the trail in a manner that does not require removal of large trees. Some minor impacts due to root damage and soil compaction are likely to result from trail construction and use, however, these impacts will be localized and will not substantially impact these areas. Impacts to old growth forests under Alternatives B and C will be adverse, but long-term in duration and minor in intensity.

Riparian Habitats
There will be negligible impacts to riparian habitats under Alternative A. Alternatives B and C will require some removal and trimming of riparian vegetation where proposed trails cross streams. This impact will be minimal as very few stream crossings with well developed riparian habitats will be required along the proposed new trails. This impact will be further minimized by locating stream crossings in areas where riparian vegetation is sparse. Impacts to riparian habitats under Alternatives B and C will be adverse, long-term, but minor in intensity.

Shasta Bally Summit
No impact will result to the unique ecological area near the Shasta Bally Summit as no trails are proposed to be located in this area.

Wildlife and Fish

Potential impacts to the wildlife and fish populations of the park resulting from the alignment of the Shasta-Trinity Trail include the following:

- Removal of habitat
- Disturbance from workers and trail users
- Erosion/Sedimentation

Whiskeytown National Recreation Area supports an abundant and diverse wildlife community, which reflects the diversity of the vegetative communities in the park. More than 200 vertebrate species are known to occur in the park, including at least 35 mammal species, 150 bird species, and 25 reptile and amphibian species. Numerous fish species are also known to occur within Whiskeytown Lake, its tributaries, and Clear Creek below Whiskeytown Dam. The perpetuation of relatively intact fish and wildlife populations within the park is partially dependent on the ability of public and private land managers to ensure that adequate habitat is protected in and around the park boundary.

Alternative A – No Action

Under this alternative, impacts to wildlife and fish communities will continue approximately at current rates within all sections. Current impacts to wildlife include some minor disturbance to nesting species from trail users along current trails and impacts to fish spawning areas located downstream of currently poorly designed and overly steep trails. Adverse impacts to fish spawning areas are due to unnaturally high levels of erosion and sedimentation resulting from poorly designed trails, particularly at stream crossings. Many of these trails were originally designed as temporary roads for resource extraction purposes and environmental impacts were not considered during design.

Under the no action alternative impacts to fish and wildlife within all sections are adverse, long-term and moderate in intensity.

Altnernative B – Minimum Trail Development

Impacts to fish and wildlife within Section 1 will be similar to impacts in Alternative A. Impacts to fish will be slightly lessened by rerouting and redesigning portions of overly steep sections that currently contribute sediment to streams. Construction of the new section of trail between the Knobcone Trail and Martha's Ditch Trail may disturb some riparian species during the breeding season. These impacts are likely to be minor as a road and other hiking trails (Guardian Rock Trail) currently exist in the same area. Impacts to aquatic wildlife and fish within Section 1 will likely be beneficial, long-term, and minor. Impacts to wildlife will be adverse, short-term, and minor – primarily due to disturbance to terrestrial species during trail construction and trail users.

Impacts to wildlife and fish species within Sections 2 and 3 will be very similar to the No Action Alternative with the exception of the additional impacts expected due to trail construction and visitor use along the proposed new routes. Primary impacts to wildlife within these sections will likely be due to temporary disturbance during trail construction and from visitor use. These impacts will be adverse, but long-term and minor in intensity.

Alternative C – Expanded Trail System Development – Proposed Action

Impacts to wildlife and fish species under Alternative C will be similar to Alternative B, with the exception that negative impacts due to disturbance will be slightly higher due to the additional 3

miles of spur trail construction. Impacts to wildlife and fish will continue to be adverse, long-term, and minor in intensity.

Cumulative impacts to wildlife and fish species under Alternatives A, B, and C in all three Sections will mostly result from additional impacts due to increased recreational use. These impacts are almost exclusively due to temporary disturbance due to trail construction and use. More impacts can be expected under Alternative B than Alternative A, and more under Alternative C than Alternatives A and B, due to increases in the amount of land affected and increases in the degree of recreational use. Cumulative impacts from habitat loss or modification are minor due to the small amount of habitat affected, especially when compared to other park projects such as fuel break construction and use of prescribed fire. Cumulative impacts to wildlife and fish species is likely to be adverse, long-term, and minor.

Special Status Fish and Wildlife Species

The alternatives for the Shasta-Trinity Trail system within WNRA were developed specifically to avoid or minimize potential impacts to special status species. The primary means of avoiding impacts to special status species was to locate the potential trail alignments away from areas where special status species are known to occur or where critical habitat exists. In some cases, particularly with fish and aquatic wildlife, implementing Alternative B or C will have some beneficial impacts. These beneficial impacts would result from the redesign and restoration of current trails that are eroding at high levels and contributing sediment to streams.

Spring-run Chinook salmon and Central Valley steelhead trout
Spring-run Chinook salmon and steelhead trout only occur in Lower Clear Creek within Section 1 as Whiskeytown Dam effectively blocks them from accessing much of their historic spawning habitat. Therefore, only impacts to Chinook salmon and steelhead trout within Section 1 will be analyzed. Numerous restoration efforts within the Lower Clear Creek watershed are ongoing in an effort to increase the productivity of this stream. The objective of many of these projects is to reduce erosion and sedimentation within the Lower Clear Creek watershed.

Alternative A – No Action

Most of the trails within Section 1 are abandoned mining or logging roads that were designed and constructed with little concern for future impacts related to erosion and sedimentation. Some of these roads are now being used as trails and contribute excessively high levels of sedimentation to streams. Under Alternative A, minor, long-term, adverse impacts would continue due to erosion from very steep, poorly designed trails.

Alternative B – Minimum Trail Development

Under this Alternative within Section 1, a segment of the Kanaka Peak Loop Trail and a segment of the Hydraulic Mine Trail will be rerouted and redesigned to reduce impacts related to erosion and sedimentation. The rerouted trails will be at a milder grade and the trail tread will be outsloped to promote water runoff and reduce erosion. Additionally, the old trail will be restored to natural conditions to prevent ongoing erosion and to prevent visitors from continuing to use old routes. Restoration measures will include recontouring and/or application of weed-free straw mulch or native mulch and seeding or planting of native species. The new trails proposed under this alternative will also be constructed to reduce long-term impacts related to erosion. Impacts to spring-run Chinook salmon and steelhead trout under Alternative B will be beneficial, long-term and minor in intensity.

Alternative C – Expanded Trail System Development – Proposed Action

Impacts will be the same as Alternative B.

Bald eagle
Whiskeytown Lake supports two breeding pair of bald eagles as well as a substantial migratory wintering population. Bald eagle activity such as perching, foraging, nesting, and roosting is generally limited to the lower elevations of the park and occurs mostly within two miles of Whiskeytown Lake. The greatest potential for impacts to bald eagles from this project is human disturbance to nesting eagles as this has been shown to sometimes cause eagles to abandon nesting attempts. To avoid this potential impact all sections of the proposed trail routes, under all alternatives were located to be ½ mile or greater from current or historic bald eagle nest sites within line-of-site, or ¼ mile or greater from current or historic bald eagle nest sites outside of line-of-site. These distances follow guidelines from the USFWS to avoid adverse impacts to nesting bald eagles.

With the above mediation in place, there will be negligible impacts to bald eagles under all alternatives.

Northern spotted owl
Only one known nesting pair of northern spotted owls are known to occur within WNRA. Some other nesting sites may exist in some of the more remote sections of the park as surveys have not been completed in all areas and some suitable habitat exists, particularly in the higher elevations near the west boundary of the park. The trail routes for the different alternatives were specifically designed to avoid suitable northern spotted owl nesting habitat, however, some short sections of trail are located near marginal foraging or roosting habitat.

Alternative A – No Action

Alternative A will not have any impacts to the northern spotted owl as suitable habitat is not present near any of the proposed routes.

Alternative B – Minimum Trail Development

Under Alternative B there is no suitable habitat for the northern spotted owl within Section 1. Section 2 has some potentially suitable habitat on the north facing slope across the drainage (to the south) from the proposed trail new trail route. This suitable habitat is more than ¼ mile from the trail route and will not be impacted by construction activities or visitor use. This distance (1/4 mile) follows USFWS guidelines for avoiding impacts to northern spotted owl activity centers. Some marginal foraging or roosting habitat may be located along this section of trail but potential impacts will be limited to temporary disturbance during trail construction activities. Impacts to the northern spotted owl will be negligible within Section 2. Under this alternative, no suitable habitat exists along the proposed trail route within Section 3.

Alternative C – Expanded Trail System Development – Proposed Action

Impacts to the northern spotted owl under Alternative C are the same as Alternative B. The proposed additional trails within this alternative do not occur in suitable habitat. The habitat near the upper reaches of the Whiskeytown Falls Trail may have met suitable foraging or roosting habitat at one time, however the area was selectively logged during the late 1960's or early 1970's and does not have the minimal 40% canopy cover necessary for the USFWS definition of suitable habitat.

Pacific fisher
Distribution and population of fishers at WNRA is not known, but the Wildlife Observation Database, dating from the early 1970's to present, reports numerous fisher observations throughout many areas of the park. It is likely that fishers occur at Whiskeytown National Recreation Area where suitable habitat exists. Suitable habitat for fishers consists of mosaics of conifer-dominated forest stands. Late successional mid to low elevation coniferous or mixed forests provide the most suitable habitat because they provide abundant potential den sites and prey. The presence of large deciduous trees, such as oaks, also appears to be important. Fishers den in a variety of protected cavities, brush piles, logs, or under an upturned tree. Hollow

logs, trees, and snags are especially important habitat criteria. Riparian areas also appear to be important.

Alternative A – No Action

Under Alternative A, impacts to fishers in all sections will remain at current levels, which are likely limited to minimal disturbance due to encounters with trail users or maintenance crews.

Alternative B – Minimum Trail Development

Impacts to fishers under Alternative B in all sections will primarily be limited to disturbance during trail construction and post construction visitor use. Habitat modification due to trail construction will be extremely minimal and small in scale as the components important to fisher habitat such as large trees, snags, denning sites, and riparian habitat will be retained. Many of the sightings of fishers in the park's wildlife observation database are along existing trails, so it is unlikely that the presence of trails or trail users causes fishers to avoid the area. Impacts to fishers under Alternative B will likely be adverse, long-term, and minor in intensity.

Alternative C – Expanded Trail System Development – Proposed Action

Impacts to fishers under Alternative C will be very similar to Alternative B, but slightly greater due to the addition of the spur trails. Impacts will be adverse, long-term, and minor in intensity.

Species of Concern

Alternative A – No Action

Under Alternative A, impacts to Species of Concern in all sections will remain consistent to current levels. Some long-term, adverse impacts to aquatic species such as the foothill yellow-legged frog, northwestern pond turtle, and tailed frog will continue due to high levels of erosion and sedimentation in areas where current trails are overly steep and poorly designed. These impacts primarily cause decreases in reproduction rates and are minor in intensity. Impacts to terrestrial species will be negligible.

Alternative B – Limited Trail Development

Under Alternative B some long-term beneficial impacts to the aquatic species mentioned above will occur in Section 1. This will be a result of redesigning a portion of the Kanaka Peak Trail, the Hydraulic Mine Trail, and Salt Gulch trails to reduce current erosion rates. This will have a long-term benefic to aquatic species in this area. Impacts to terrestrial species will be negligible within Section 1.

Within Section 2, impacts to Species of Concern will mostly be related to short-term disturbances from noise associated with trail construction and trail use by visitors. Design and construction of this trail will incorporate methods that will minimize long-term erosion, however, some short-term increases in erosion are likely due to soil disturbance during construction. Most of this trail is also located along a ridgetop which is a significant distance from aquatic habitats that are more susceptible to erosion-related impacts than upland habitats. Long-term impacts within Section 2 will be beneficial and minor in intensity while short-term impacts will be adverse, and minor in intensity.

Within Section 3, impacts to Species of Concern will be minimal. The only new trail construction will be along the ridge that separates Mill Creek from Crystal Creek and this will follow a current fuelbreak where the need for vegetation removal is minimized. Some minor short-term, adverse impacts will occur due to disturbance related to trail construction and use.

Alternative C – Expanded Trail System Development – Proposed Action

Impacts to Species of Concern within Sections 1 and 2 will be identical to Alternative B.

Impacts to Species of Concern within Section 3 will be similar but slightly greater than Alternative B due to the construction of 3 additional miles of spur trails.

Cumulative impacts to special status wildlife and fish species under Alternatives A, B, and C in all three Sections will mostly result from additional impacts due to trail construction activities and increased recreational use. These impacts are primarily related to temporary disturbance. These impacts are minimized by aligning the trail to avoid known breeding habitat of listed species. Potential impacts from this project to special status species are considerably less than those from other ongoing park programs such as prescribed fire projects, fuel break construction and maintenance, and wildland firefighting. Cumulative impacts to special status wildlife and fish species from all alternatives is likely to be negligible.

Cultural Resources

Archeological Resources, Historic Structures, Ethnographic Resources, and Cultural Landscapes

Much of the proposed trail route has not been surveyed for archeological resources. The proposed trail route within Alternatives B and C was designed to avoid known archeological sites or areas where archeological resources are probable.

This project does not meet the requirements of an exclusion under the 1995 Servicewide Programmatic agreement among the National Park Service, the Advisory Council on Historic Preservation and the National Conference of State Historic Preservation Officers. Standard consultation under Section 106 of the National Historic Preservation Act (36 CFR 800) will be completed prior to any trail construction activities with the potential to effect cultural resources. Vegetation may be removed by hand along the proposed trail corridor to allow access for archeologists to perform survey work in areas where dense brush makes access difficult. Chainsaw operation in the vicinity of the Whiskeytown Environmental School will be scheduled to avoid impacts on the Wintu Pe' Lane Bos educational camp. Additionally, in the event that archeological resources not identified during previous surveys are discovered during trail construction, all work will stop in the site vicinity and consultation with the state historic preservation office will be reinitiated.

Park Operations

Park operations potentially affected by creation of the Shasta-Trinity Trail include maintenance, law enforcement, and fire and emergency services. Impacts analysis to park operations will by analyzed by alternative only and not by section.

Alternative A – No Action

Under this alternative, trail maintenance needs and workload of Whiskeytown NRA emergency response personnel due to emergency medical or search and rescue services will likely remain similar to current levels. Current emergency responses to trail users do not occur often and impacts to current park operations will likely be negligible.

Alternative B – Limited Trail Development

Under this alternative, trail maintenance needs will be increased and emergency responses to trail users will also likely increase. Approximately 6.5 miles of new trail will be constructed under this alternative, which is an increase in the park's total trail length of approximately 10%. It is likely that the increase in trail maintenance needs will also be approximately 10%. Without

additional funding, the impacts of this to park operations, particularly maintenance, will be long-term in duration and moderate in intensity due to significant impacts to the park's workload. However, it is expected that proper planning of the proposed trail will superior in design compared to the already established trails within the park. This superior design will hopefully reduce maintenance requirements when compared to other trails. Additionally, the overall impacts to park operations could be mitigated if volunteer groups adopt certain sections of trail. In this event, the impacts to park operations would be long-term in duration and minor in intensity.

Similarly, without additional funding, impacts to the park's law enforcement and fire management programs will be long-term in duration and minor in intensity. At present, there are very few backcountry search and rescue incidents and emergency responses. The expected increase in trail-use under this alternative will most likely result in a minor increase in incidents. However, the park's well-trained and large emergency response workforce has a well-established Incident Command System which is more than prepared for any increase in backcountry incidents.

Alternative C – Expanded Trails System Development – Proposed Action

Under this alternative, trail maintenance needs will be increased and emergency responses to trail users will also likely increase. Approximately 11 miles of new trail will be constructed under this alternative, which will increase the park's total trail length by approximately 15%. It is likely that the increase in trail maintenance need will also be approximately 15%. Without additional funding, the impacts of this to park operations, particularly maintenance, will be long-term in duration and moderate in intensity due to significant impacts to the park's workload. However, it is expected that proper planning of the proposed trail will superior in design compared to the already established trails within the park. This superior design will hopefully reduce maintenance requirements when compared to other trails. Additionally, the overall impacts to park operations could be mitigated if volunteer groups adopt certain sections of trail. In this event, the impacts to park operations would be long-term in duration and minor in intensity even without additional funding.

Similarly, without additional funding, impacts to the park's law enforcement and fire management programs will be long-term in duration and minor in intensity. At present, there are very few backcountry search and rescue incidents and emergency responses. The expected increase in trail-use under this alternative will most likely result in a moderate increase in incidents. However, the park's well-trained and large emergency response workforce has a well-established Incident Command System which is prepared for any increase in backcountry incidents.

Visitor Use and Experience

Alternative A – No Action

Under this alternative, the Shasta-Trinity Trail would utilize existing trails and roads to route trail users through the park. Since no additional trail construction would be undertaken, no adverse impacts on visitor use and their experience would ensue. Increased use of existing trails is expected, but with minimal added impacts to the existing trails. Trail maintenance needs may increase slightly, but few additional resources will be needed.

Alternative B - Limited Trail Development

There would be numerous, but short-term minor impacts to local visitor use and their experience with this alternative. In places where the Shasta-Trinity Trail utilizes existing trails and roads, no adverse impacts would result, although there would be some upgrading of existing trails. The Trail's alignment under this alternative, however, requires additional trail construction and rerouting to be undertaken. Increased use of existing trails is expected, but with minimal added impacts to the existing trails. Trail maintenance needs may increase slightly, but few additional resources will be needed. Some conflicts among users may be expected on multi-use trails. The park currently has not collected information on amount, duration, location, or season of trail use but will do so as part of the planned Backcountry Management Plan, as identified in the General

Management Plan. The Backcountry Management Plan will identify where conflicts are occurring and how they can best be mitigated.

In Section 1, while the majority of the Trail would utilize existing trails and roads, a small section of trail (about 3000 feet) would need to be constructed to connect the Knobcone Trail at NEED camp bridge with Martha's Ditch Trail and a short segment (600 feet) would be constructed adjacent to Mule Town Road near the Salt Creek/Buck Hollow Trailhead. This new construction would result in short-term impacts due to the presence of trail-construction equipment and the inability of trail users to utilize the new sections of trail that would connect existing trails to the new sections. The visitor experience would be enhanced due to the ability of visitors to travel from the east side of the park through to the west side on a well-marked and maintained trail system. The impacts would be beneficial and be short-term and minor in intensity.

In Section 2, visitor use impacts would be the greatest since approximately 3 miles of new trail would need to be constructed, virtually the entire length of trail through this section. This new construction would not directly impact the visitor since they would be excluded from the area until the trail was completed. The trail construction activities would be beneficial, short-term and minor in intensity.

There would be minimal impacts to the visitor use experience in Section 3 also, as this alternative's proposed alignment would utilize a ridge top fuelbreak and the existing trails before crossing under the bridge at Highway 299. There would only be a small amount of vegetation that would need to be removed from this section since the fuelbreak has already been cleared of most vegetation. Impacts to visitor use in this section will be negligible.

Alternative C – Expanded Trails System Development – Proposed Action

Impacts to visitor use would be similar to those described for Alternative 2. This Alternative would result in a well-constructed trail all the way through the park as well as the spur trails that have been included in this EA. The trail would be constructed to retain the character-defining features and standards associated with the heavily-used portions of the existing trail system within the park. A handrail will be installed on approximately 150 feet of the uppermost portion of the trail approaching the waterfalls. The rock will be drilled out and the handrail inserted into the rock to allow safe access to the uppermost portions of the falls. Improvements to the trails within the project area would result in an improved visitor experience on the Shasta Trinity Trail as well as the spur trails that will be constructed in various other sections of the park. Some conflicts among users may be expected on multi-use trails. The park currently has not collected information on amount, duration, location, or season of trail use but will do so as part of the planned Backcountry Management Plan, as identified in the General Management Plan. The Backcountry Management Plan will identify where conflicts are occurring and how they can best be mitigated.

Impacts resulting from the implementation of this alternative would be similar to those in Alternative B; however, there would be several additional spur trails constructed under this alternative, including the construction of about 2 ½ miles of new trails in Section 3 (see Figure 4). The impacts from creating these two new trail spurs would be similar to those already described for other new trail segments. This alternative's Section 3 contains more new or reconfigured trail segments than Alternative B but, as these would not be constructed simultaneously, visitor use impacts could be kept at a minimum by phasing in work in this section. Increased use of existing trails is expected, but with minimal added impacts to the existing trails. Trail maintenance needs may increase slightly, but few additional resources will be needed.

During trail construction, however, there would be a few months (over approximately ten years) of disruption of the backcountry experience due to human activity associated with construction. Until the new trail is constructed, visitors would continue to use the current existing trails. The results of the trail construction activities would be beneficial due to improved access to some of the heretofore inaccessible and more scenic areas of the park, short-term in duration and minor in intensity due to minimal impacts to the resource.

Cumulative Impacts: Cumulative impacts to the visitor use and experience will vary by alternative. Because there is no trail construction associated with Alternative A, the cumulative impact of this alternative's actions on visitor use and experience would be negligible. Although there would be construction of new trails under Alternative B, the process of trail construction requiring the use of mechanized equipment would produce impacts that would be very site-specific and short-term. The lasting impact on visitor use and experience would be negligible. The impacts under Alternative C are similar to those of Alternative B, with the exception that additional trails would be constructed. These impacts would be short-term but very beneficial in their result. There would be no lasting impact on the visitor use and experience, resulting in minor and long-term beneficial impacts.

Socioeconomic Considerations

Under Alternative A there will be no socioeconomic impacts.

Under Alternatives B and C, it is likely that the trail system will gain national recognition and visitors from outside the area can be expected to come to hike, bike, and ride the trail, bringing with them their needs for consumer services and benefiting the local economy. Additionally, the trail will create a link between the park and the local communities promoting a sense of connection between the two. Socioeconomic impacts will likely be beneficial, long-term and moderate in intensity.

Conclusion

The National Park Service, in cooperation with multiple federal and state agencies and local organizations, is proposing to construct a portion of the Shasta-Trinity Trail System through the Whiskeytown National Recreation Area. A number of alternatives were considered along with the potential resulting impacts to physical resources, biological resources, cultural resources, overall visitor experience, and local socioeconomic conditions. The preferred proposal will lead visitors from the southeast corner of the park to the northwest corner of the park and include construction of a number of spur trails which lead visitors to scenic destinations or vistas that currently are inaccessible. The completion of an improved trail system within the recreation area was identified in the Park's General Management Plan and Business Plan as a high priority. The trail system will be constructed using NPS trail construction guidelines and will be constructed in a manner to minimize impacts to local resources. Completion of this project will not result in impairment of park resources.

Consultation and Coordination

The National Park Service has followed a public process to identify the issues and concerns related to alignment and construction of the Shasta-Trinity Trail System within Whiskeytown National Recreation Area. From the initial scoping sessions with members of the public and other agencies, a series of alternatives were developed, analyzed and presented to the public. Public comments and responses have provided further refinement of the decision to be made.

Agencies and organizations consulted with include Bureau of Land Management, United States Forest Service, Redding City Council, Shasta County Board of Supervisors, Trinity County Board of Supervisors, and Western Shasta Resource Conservation District.

List of Preparers

Jim Milestone, Superintendent, Whiskeytown National Recreation Area
Carolyn Daugherty, Volunteer, Whiskeytown National Recreation Area
Steve Femmel, Natural Resource Specialist, Whiskeytown National Recreation Area
Joe Svinarich, Fire Archeologist, Whiskeytown National Recreation Area
Gretchen Ring, Botanist, Whiskeytown National Recreation Area

Paul DePrey, Chief of Resources, Joshua Tree National Monument
SteveThede, Chief of Interpretation, Whiskeytown National Recreation Area
Brian Rasmussen, Geologist, Whiskeytown National Recreation Area
Jennifer Gibson, Ecologist, Whiskeytown National Recreation Area
Russ Weatherbee, Wildlife Biologist, Whiskeytown National Recreation Area

Distribution List

Copies of this environmental assessment will be available for review at the Shasta County Library in Redding, at Park Headquarters, and at the Visitor Center. The document will also be available to the public on the park's website. Compact discs containing the document will also be available upon request. Hard copies of the document will be sent to interested groups or agencies that have attended public meetings or who participated on the Shasta-Trinity Trail Steering Committee. These include the Redding Mountain Biking Club, American Trails, Trails and Bikeways Council of Greater Redding, Shasta County Sportsman's Association, Bureau of Land Management (Redding Field Office), Bureau of Reclamation, French Gulch Community, Institure for Sustainable Communities, Shasta College, Shasta County Board of Supervisors, Shasta County Public Health Department, Shasta Land Trust, Sierra Club, Sierra Pacific Industries, Trinity County Resources, Conservation and Development Council, U.S. Forest Service (Shasta-Trinity National Forest), Horsetown Clear Creek Preserve, Redding Rancheria, Weaverville Basin Trail Committee, WeSkiI, Western Shasta Resource Conservation District, City of Redding, McConnell Foundation, Backcountry Horseman of America, and Viva Downtown. An email will be sent to all people who have attended public meetings with instructions on how to access the document on the park's website and a press release will be issued to local media, agencies, and groups announcing the availability of the document and where it can be accessed. Local media, agencies, and groups who receive copies of press releases include Anderson Chamber of Commerce, U.S. Bureau of Reclamation, Bureau of Land Management, Chico Enterprise, KLXR, Chico News, KEWB, KHSL, KIXE, KBLF, KNCQ, KQMS, Tehama Trader, Valley Post, Redding Record Searchlight, U.S. Forest Service, Redding Chamber of Commerce, After Five Magazine, Redwood National Park, KRCR, Sacramento Bee, Shasta County Board of Supervisors, KVIP, Red Bluff Daily News, Weaverville Chamber of Commerce, Office of Barbara Boxer, Office of Wally Herger, Chico 24, JFK Public Radio, Oak Bottom Marina, and Channel 7.

References

Baker, 1990, *Archeological Excavations at CA-SCA-479 and CA-SHA-195, Whiskeytown Unit, Whiskeytown-Shasta-Trinity National Recreation Area, Shasta County, Ca.* Report prepared by NPS, on file at Redwood National Park.

Bevill, In Progress, *Archeological Investigations at CA-SHA-559, Whiskeytown-Shasta-Trinity National Recreation Area, Ca*.

DuBois, 1986, *Wintu Ethnography*, University of California Publications in American Archeology and Ethnology, Berkeley.

Eidness, 1988, *Report On 1986-87 Archeological Fieldwork Conducted by Park Service Staff in the Whiskeytown NRA, Whiskeytown-Shasta-Trinity National Recreation Area Shasta County, California*. Report prepared by NPS, on file at Redwood National Park.

Griffin and others, 1994, *Archeological Survey 1993, Whiskeytown Unit , Whiskeytown Unit, Whiskeytown-Shasta-Trinity National Recreation Area, Ca*. *Whiskeytown-Shasta-Trinity National Recreation Area, Ca*

Griffin and others, 1995, *Cultural Resources Inventory Shasta Divide Burn Unit,*

Whiskeytown Unit, Whiskeytown-Shasta-Trinity National Recreation Area, Ca. Whiskeytown-Shasta-Trinity National Recreation Area, Ca

Mendocino County Resource Conservation District, *Handbook for Forest and Ranch Roads*, 1994

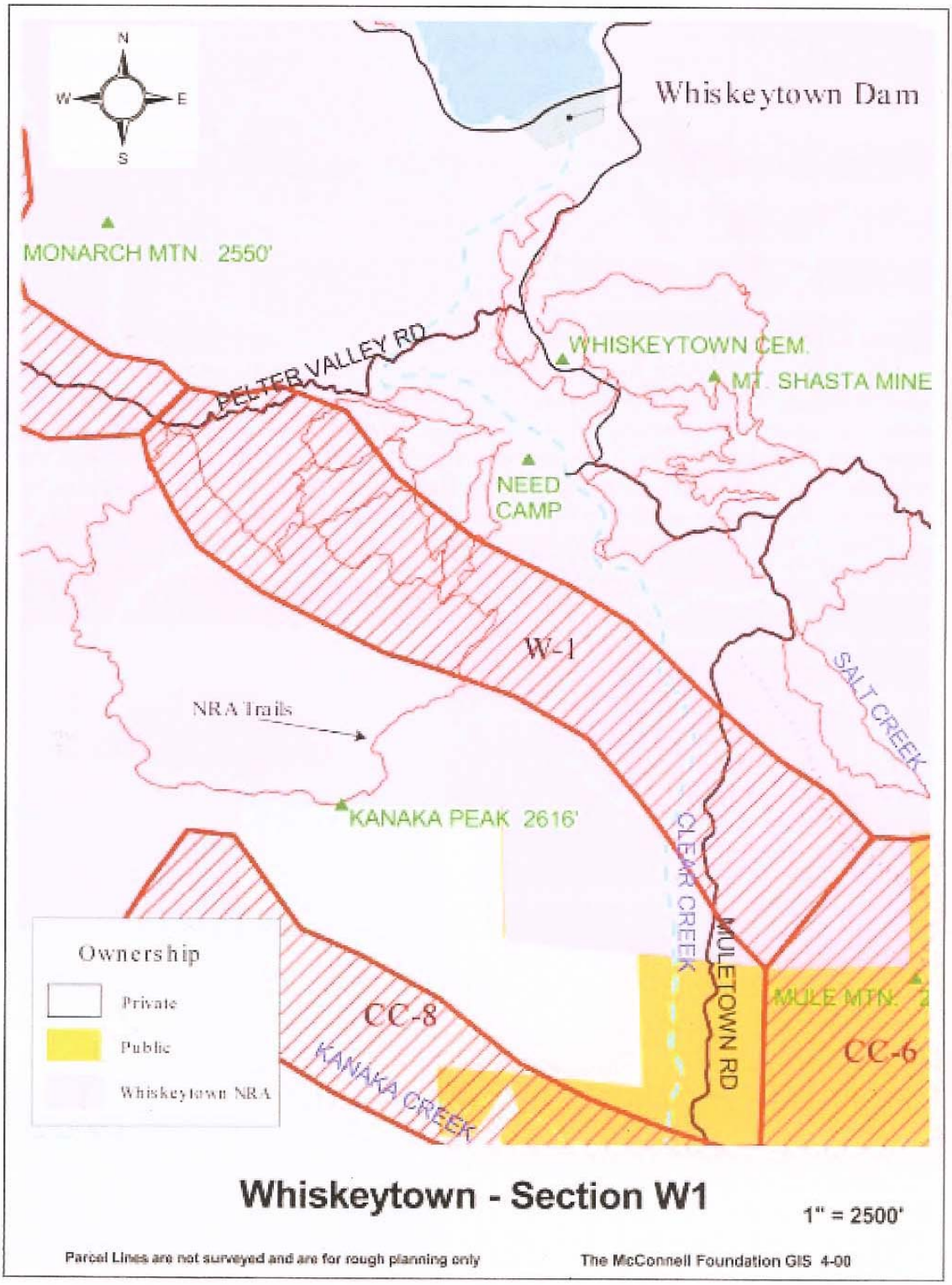
Spreiter, T., 1992, *Watershed Restoration Manual*, Redwood National Park Watershed Restoration Program, Orick, CA.

Toogood and Henderson, 1973, *Historic Structure Report: Tower House Historic District, Historical and Architectural Data Section, Whiskeytown National Recreation Area, California*. Report prepared by NPS, on file at Whiskeytown NRA and Redwood National Park.

Western Shasta Resource Conservation District, 1996, *Lower Clear Creek Watershed Analysis*, Western Shasta Resource Conservation District, Redding, CA.

Appendix 1 – from Shasta-Trinity Trail draft Concept Plan

Shasta-Trinity Trail



42

APPENDIX 1

Appendix 2 – from Shasta-Trinity Trail draft Concept Plan

Whiskeytown Region

Segment: W-1

Route Description:

This segment connects Mule Mountain and Muletown Road (see LCC-8) to area of the NEED Camp and Peltier Valley Road within Whiskeytown National Recreation Area.

Opportunities and Constraints:

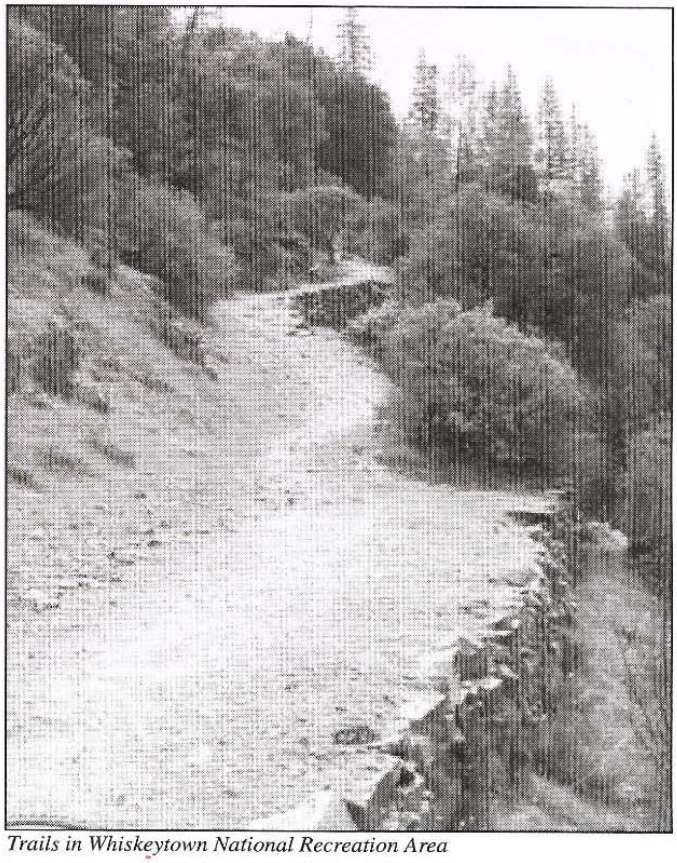
There are several alignment options available within this segment. From Mule Mountain Ridge, it is possible to provide a trail closer to Clear Creek from Mule Mountain. Once in the Park, there are several existing trails that could be followed, an exact route would need to be selected and signed. The trail would have to cross Clear Creek, unless trail routed down closer to NEED Camp, where it could use the existing road to cross the creek. Putting trail users through the NEED Camp might disturb the camp's environmental education activities, so the alignment would have to be carefully selected.

Lead Agency:

Whiskeytown National Recreation Area

Stakeholders:

NEED Camp



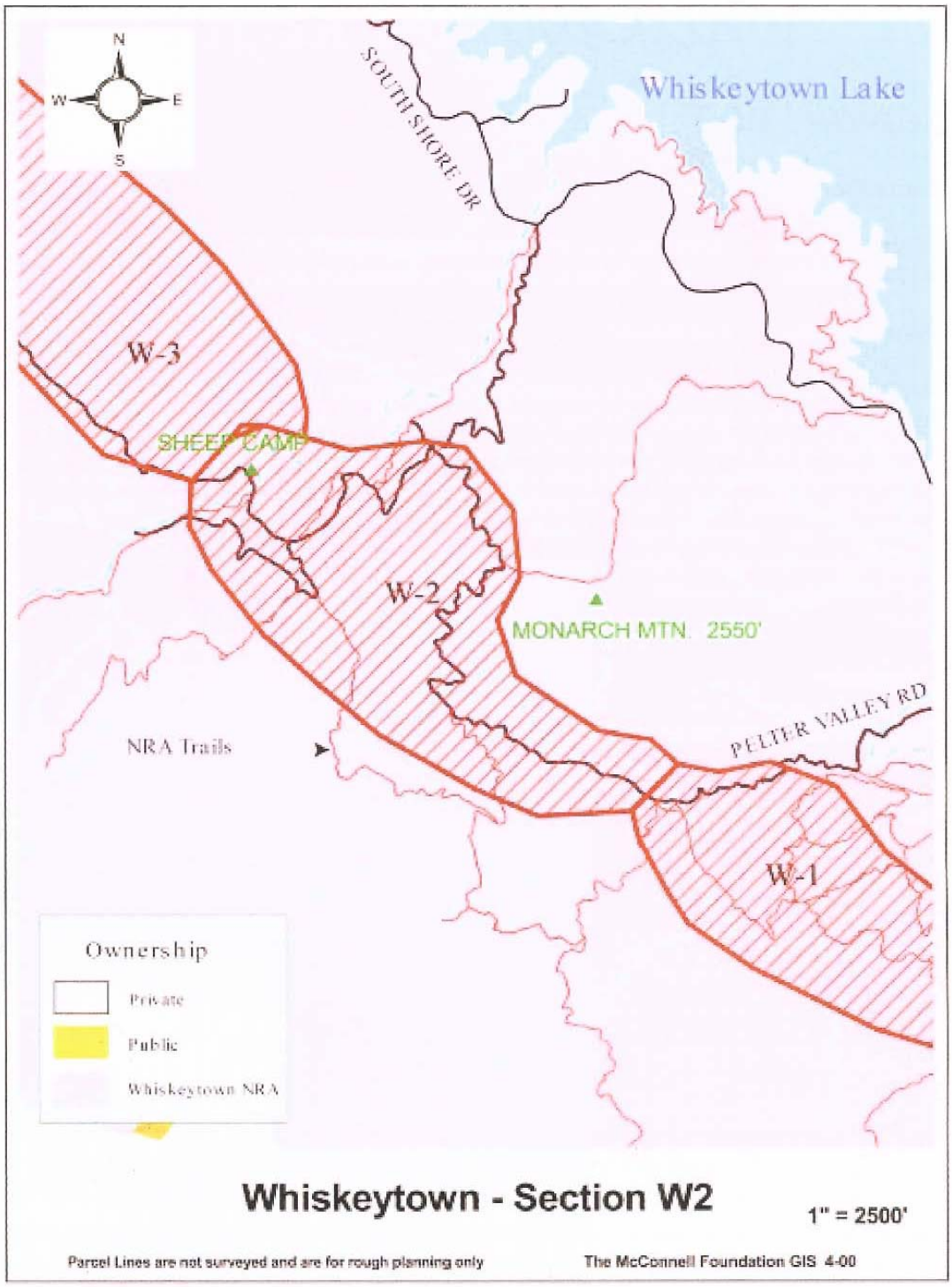
Credit: Whiskeytown National Recreation Area

Trails in Whiskeytown National Recreation Area

Appendix 2

Appendix 3 – from Shasta-Trinity Trail draft Concept Plan

Shasta-Trinity Trail



44

Appendix 3

Appendix 4 – Shasta-Trinity Trail draft Concept Plan

Whiskeytown Region

Segment: W-2

Route Description:

Connects Peltier Valley Road with Sheep Camp within Whiskeytown National Recreation Area.

Opportunities and Constraints:

The trail could follow existing trails and roads to reach Sheep Camp. The road is open to vehicles, but get little traffic currently. An alternative route not on the road might be preferable to trail users, however. Sheep Camp provides a staging area suitable for equestrian users and overnight camping facilities.

Lead Agency:

Whiskeytown National Recreation Area

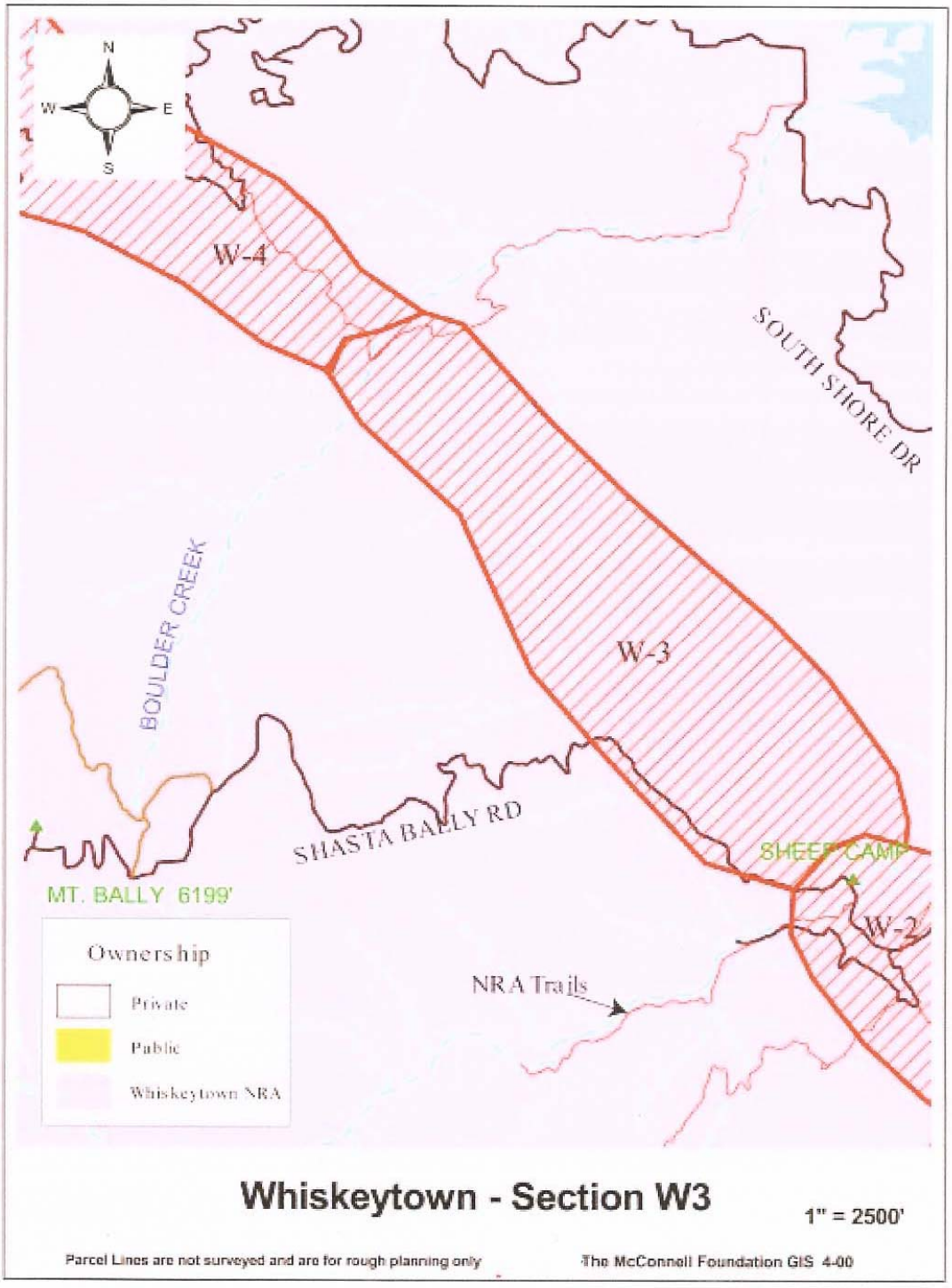
Stakeholders:

Users of the Sheep Camp Equestrian staging area

Appendix 4

Appendix 5 – from Shasta-Trinity Trail draft Concept Plan

Shasta-Trinity Trail



46

Appendix 5

Appendix 6 – from Shasta-Trinity Trail draft Concept Plan

Whiskeytown Region

SEGMENT: W-3

ROUTE DESCRIPTION:

Connects Sheep Camp with Boulder Creek

OPPORTUNITIES AND CONSTRAINTS:

This part of the Recreation Area was relatively undisturbed by logging as compared to other parts. Thus this segment of the trail would require completely new trail construction. Some old logging roads and skid tracks may be present that could be incorporated into a trail system, but these may not provide the route needed to circumnavigate the lake. Because bald eagles nest in this area, there is a potential impact on sensitive wildlife species to consider. Boulder Creek Falls is a destination point for many users, thus this connection might be attractive for users. This section of the trail should also provide good views of the lake.

LEAD AGENCY:

Whiskeytown National Recreation Area

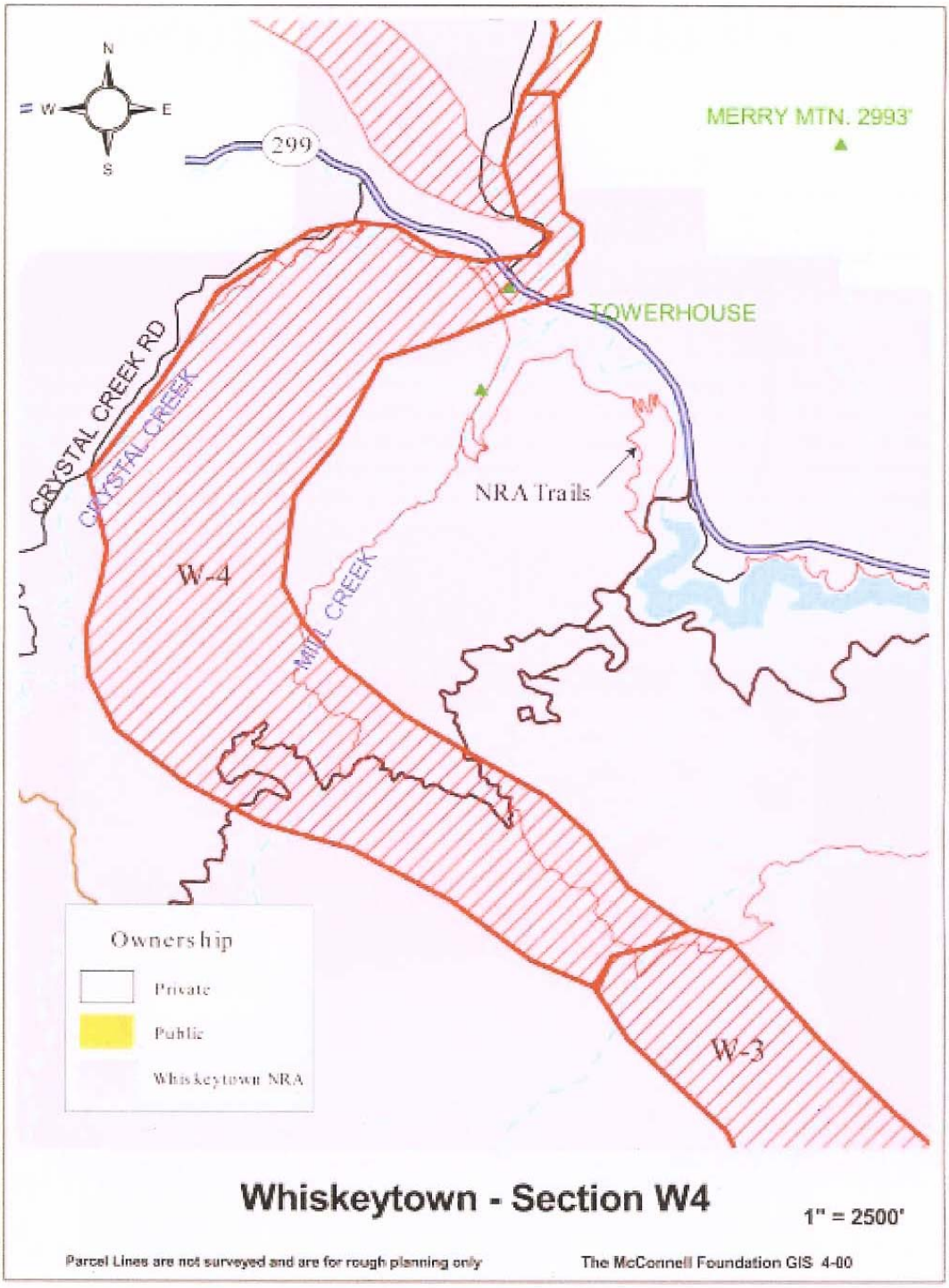
Credit: Whiskeytown National Recreation Area

Shasta Bally Overlooking Whiskeytown Lake

Appendix 6

Appendix 7 – from Shasta-Trinity Trail draft Concept Plan

Shasta-Trinity Trail



48

Appendix 7

Appendix 8 – from Shasta-Trinity Trail draft Concept Plan

Whiskeytown Region

Segment: W-4

Route Description:

Connects the Boulder Creek Falls area with the Towerhouse District, Crystal Creek Road, and Highway 299. The proposed segment then continues on to a proposed staging area on Clear Creek on the Trinity Mountain Road.

Opportunities and Constraints:

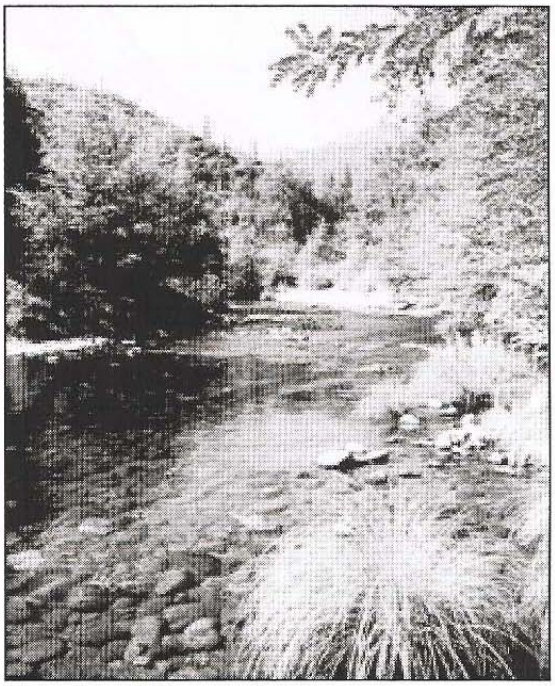
This trail travels through some heavily used areas of the Park and some of its most historic areas. Existing trails along Boulder Creek and the Water Ditch trail could be incorporated into the segment. There is a short gap between the Water Ditch Trail and the Crystal Creek Trail. Once completed, it could provide a loop opportunity for park visitors in addition to providing a route for the backbone Shasta-Trinity Trail. The Towerhouse District provides an excellent interpretative opportunity. The Park already has interpretative signs in the area. The parking area off Highway 299 for the Towerhouse District already provides a staging area for the trail. A planned new staging area on Trinity Mountain Road would provide better access to equestrians. The connection to this new staging area would have to cross under Highway 299. The bridge from Trinity Mountain Road across Clear Creek to the proposed staging area is in need of repair and possible replacement/alternate access. The Upper Clear Creek Watershed is currently undergoing a Coordinated Resources Management Planning process.

Lead Agency:

Whiskeytown National Recreation Area

Stakeholders:

French Gulch Community
CalTrans
Western Shasta Resource Conservation District



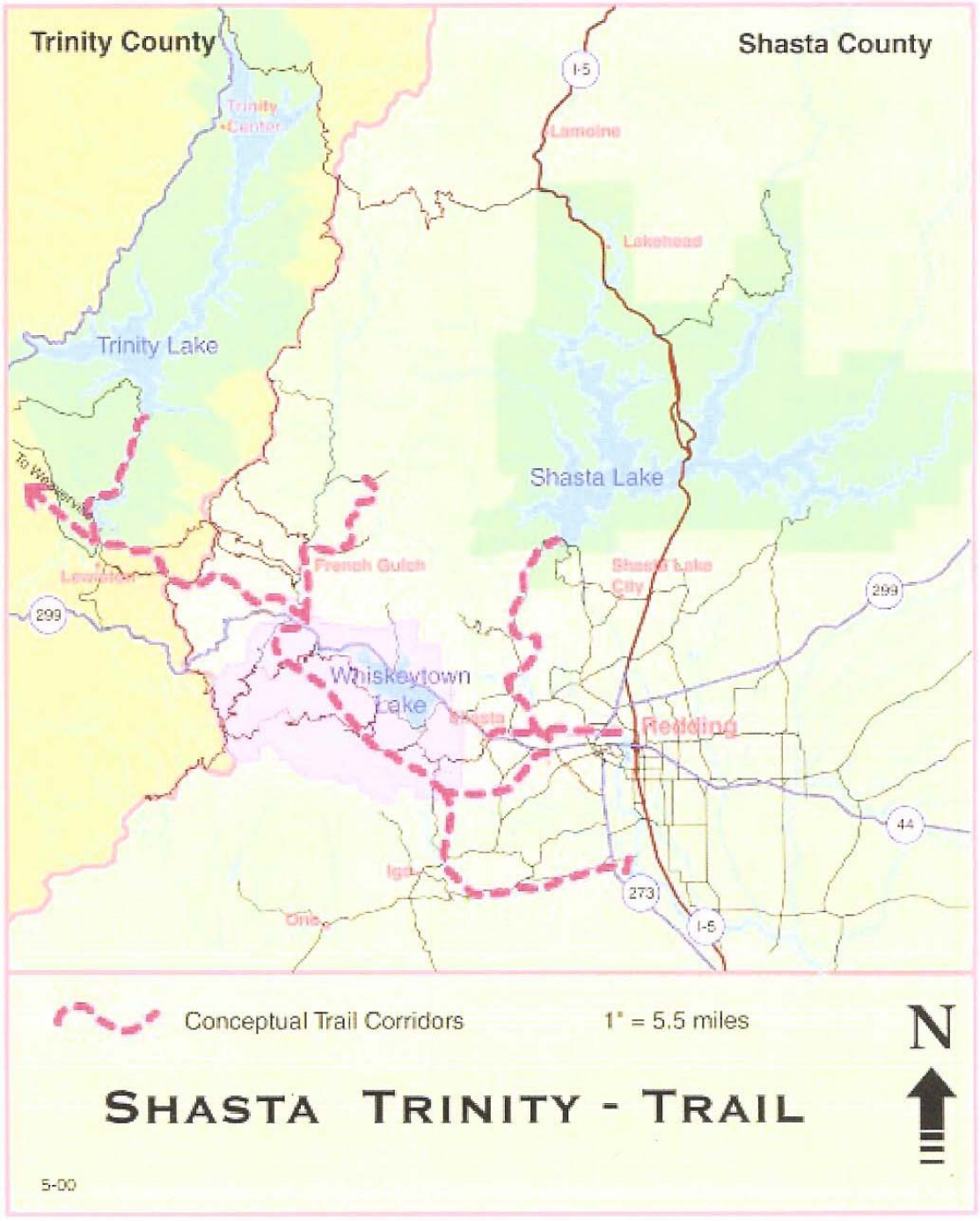
Credit: Whiskeytown National Recreaion Area

Upper Clear Creek at Whiskeytown

Appendix 8

Appendix 9 – from Shasta-Trinity Trail draft Concept Plan

Shasta-Trinity Trail



Credit: McConnell Foundation GIS

Map 1. Draft Conceptual Corridors

4

APPENDIX 9